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1919-20

W. G. FARLOW

F. S.

THE PLANT DISEASE BULLETIN

Issued By

The Plant Disease Survey

VOLUME III.

NUMBER 1

June 15, 1919

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

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CABBAGE

Rot caused by Sclerotinia libertiana Fekl.

In Texas *Sclerotinia* seems to be general on cabbage according to reports of L. R. Hesler. At San Benito and Mercedes it was the most prevalent and destructive cabbage disease on March 14. In this locality it was found in every field in about the same amounts. In many cases heading was prevented, while in other cases the mold was followed by slimy soft rot resulting in the destruction of the head. From 2-16% (average 3%) of the plants were affected. As the acreage is large for this section the total loss was considerable.

In Alabama, Mississippi and Louisiana this fungus was not very prevalent on cabbage, although it was observed in slight amount in some instances.

Inspection of 3 cars of cabbage from Alabama in northern markets revealed the presence of watery soft rot in slight amounts, the decay in 1 car being somewhat heavier and affecting one half of head in a few cases. Two cars originating in California showed contents affected, one car with 3% of cabbage slightly decayed, the other car with half of cabbage decayed in outer leaves and a coating of white mold on many heads. One car of Florida cabbage was badly decayed, 40% of heads affected, 1/3 of this decay affecting nearly half of head, 2/3 affecting outer 4 to 10 leaves.

Yellows caused by Fusarium conglutinans Woll.

Alabama: (Hesler, April 12.) Not so conspicuous as last year about Mobile and Theodore. Judging from appearances however it may be expected to become more abundant as season progresses. Fields observed showed from a trace to 17% affected plants. Early Summer variety mostly grown.

Mississippi: (Hesler) This is the most prevalent and destructive cabbage disease at present in the state. At Crystal Springs it seems almost certain that with continued warm weather the disease will reduce the crop considerably. Growers agree that in 1917 the disease was serious, but in 1918 even on the same land the fungus did practically no damage. This year it was observed in every field of cabbage. In one case 4% total loss was seen but this is regarded as only a mild affection.

(Fields, April 26.) Reported from the region around Canton.

Louisiana, St. Bernard and Dalcour Sections: (Hesler, March 24.) General throughout these areas where heavy acreages are grown. In one plantation 5% of the plants were dead or dying and 10% in addition showed poorly developed heads. The disease is rather severe in this section where the crop is grown year after year.

Black leg caused by Phoma lingam (Tode.) Desm.

Alabama, Mobile and vicinity: (Hesler, April 12.) Cases found in practically all fields. Most severe case observed near West Mobile on field which had produced cabbage for fourteen years.

Mississippi: Slight to moderate damage was noted at Crystal Springs and a trace at Canton. The most severe case noted at Crystal Springs was a field with 7% of the plants affected to such an extent that heading was a failure.

Black mold caused by Alternaria brassicae (Berk.) Sacc.

Alabama, Mobile: (Hesler, April 12.) Traces found in every field. Nowhere serious enough to cause damage however.

Florida, Vicinity of Moore Haven and Ft. Myers: (G. K. K. Link.) Very bad in one field of 100 acres which also had 50% black rot.

Two cars of Florida cabbage inspected at northern markets showed considerable spotting of leaves and an occasional head badly decayed.

Texas: Common in cabbage areas, especially on older plants.

Black rot caused by Bacterium campestre (Pam.) E. F. Sm.

Alabama: In one car of Alabama cabbage an occasional head was found to be badly decayed by black rot.

Florida, Vicinity of Moore Haven and Ft. Myers: (G. K. K. Link, March 22.)

"Cabbage showed a lot of black rot. One field of 100 acres was found which showed only 50% of a crop due to ravages of black rot."

Sclerotium blight caused by Sclerotium rolfsii Sacc.

Traces were observed by L. R. Hesler at San Benito, Texas, March 14 and at Mobile, Alabama, April 12.

Downy mildew caused by Peronospora parasitica (Pers.) DeBy.

This disease was observed by L. R. Hesler in Texas March 14, Mississippi April 18, and Alabama April 12. In no case was it doing serious damage.

Ring spot caused by Mycosphaerella brassicicola.

California: (Milbrath, April 19.) Severe cases found at Colma, both in fields and in crates packed for shipment. In the field the disease was evidently on all parts of exposed leaves. Growers state that the disease has been present as long as they can remember.

Soft rot caused by various organisms.

Table 1. Losses from slimy soft rot probably caused by Bacillus carotovorus as shown by inspection of cars in northern cities by the Bureau of Markets.

Origin of shipment	No. of cars with decay	Percent affected heads	Remarks as to seriousness of decay
Alabama	17	8 cars 7% :10 " 32%	Usually in outer leaves and slight. Very heavy decay in top of each car, slighter at bottom of car.
California	27	:12 " 18% :15 " 4%	Decay variable, heaviest at top. Mostly slight decay of outer leaves.
Florida	11	:3 " 100%	Decay in outer 3 to 5 leaves, occasional head worthless in all crates.
		:4 " 35%	Part slight decay, some bad decay.
Louisiana	8	:4 " 8% :1 " 85%	Decay slight, mostly in spots. Some total decay, mostly slight.
North Carolina	1	:7 " 12% :1 " 25%	Decay in outer 1 to 5 leaves. Decay in 3 to 8 leaves, some total decay.
South Carolina	1	:1 " 2%	Slight decay in 2 to 5 leaves.
Texas	21	:5 " 67% :5 " 30%	Much bad decay in all cars, some stock worthless. Heaviest at top of load. Decay largely in outer leaves, a few worthless heads noted.
Mexico	1	:11 " 5%	Decay slight, affecting outer leaves. Occasional head showed decay.

Table 2 Losses from decay or soft rot, the causes for which are not given, as reported by inspectors of the Bureau of Markets.

Origin of shipment	No. of cars with decay	Percent affected	Remarks as to seriousness of decay
Alabama	5	:1 car 50% :1 " 16% :3 " 5-10%	Decay bad in all but lower layer. Outer 2 to 4 leaves affected. Slight decay of 2 to 4 leaves.
California	4	:2 " --- :1 " 30%	Decay slight in outer 1 to 6 leaves. Large spots of decay in 4 to 8 outer leaves.
Florida	2	:1 " 45-50% :1 " 100%	Affecting outer 1 to 3 leaves. From a few leaves to entire head.
Louisiana	2	:1 " ---	Slight decay in top layer of cabbage.
Maryland	1	:2 " 2-3% :1 " 100%	Decay in spots in outer leaves only. Top layer 50% total decay, 50% slight, balance of load requiring trimming of 3 to 5 leaves, some heads total loss.
Mississippi	4	:1 " 25% :1 " 15% :2 " 5%	Decay of outer 1 to 3 leaves. " " " " " " " Slight decay of 1 to 3 leaves.
South Carolina	1	: ---	Occasional head showing decay.
Texas	9	:4 " 50% :2 " 15-16% :3 " 3%	Mostly in outer leaves (2 to 3). Decay in outer leaves only. Slight decay in 1 to 3 leaves.
Virginia	2	: ---	Slight in some crates, heavy in others.

Leaf speck (cause indefinite).

California cabbage inspected at Chicago was rather heavily spotted with "leaf speck", 3 cars with 25%, 40% and 100% of contents affected, another car with 2% of heads so spotted. This trouble was in the form of small, irregular, dull black spots in outer leaves.

Considerable leaf speck was found in a field of 100 acres at Moore Haven, Florida, March 22-29 by G. K. Link.

A leaf speck, suspected as being caused by Bacterium maculicolum, was reported from Louisiana, Alabama, Mississippi, and Texas by L. R. Hesler in March and April. In no case was it doing more than moderate damage to the leaves.

Lightning injury.

Mississippi: (Hesler, April 18.) A case was observed where all the plants were dead in a small area probably 30 feet in diameter. The grower claimed that lightning struck the spot during a rain storm about April 15.

Gray mold rot caused by Botrytis sp.

In 2 cars of California cabbage 15 and 25% gray mold rot was noted, affecting outer 2 to 10 leaves. Texas cabbage showed only an occasional badly decayed head.

LETTUCE

Drop caused by Sclerotinia libertiana Fekl.

Alabama: One to 2% of the plants badly affected in places near Mobile, April 12.

Florida: Drop was serious in the Sanford district this season according to reports of members of the Office of Cotton, Truck and Forage Disease Investigations. Apothecia resulting from last year's sclerotia were to be found abundantly on February 21.

Louisiana: (Edgerton, June 1.) Quite severe in some fields; 25% affected plants occurred in some cases but the average is of course much lower.

Mississippi: At Canton, where there are large plantings of lettuce and where lettuce is a comparatively new crop, the plants were unusually healthy. Only a slight amount of drop was found on one farm.

New Jersey: (Massey, C. & T. News Notes, March 22 and May 3.) Practically all growers throughout the trucking section of the northern part of the state experienced serious losses from lettuce drop in their cold frames, and cases of complete failure were common.

North Carolina: (Jehle, April 26.) Only a few plants were found affected with drop in Hanover County, where a good many fields were visited.

Texas: (Hesler, March 19.) General and doing considerable damage about Dickinson and Houston. Often affected heads were completely destroyed.

Table 3. Losses from watery soft rot of lettuce as shown by inspection of cars by the Bureau of Markets, 1919.

Origin of shipment	No. of cars with decay	Percent of decay	Remarks as to seriousness of decay
California	4	3 cars 5% : 1 " 12%	Decay usually slight, although rather heavy at top of load.
Florida	7	3 " 75% : 2 " 20%	All heads showing decay in 1 car, some crates with lettuce badly decayed. Decay present only in half of load.
South Carolina	1	2 " 5% : 1 " 66%	Decay slight. Decay in 3 to 10 leaves, following tip burn.
Texas	4	2 " 100% : 2 " 50%	Decay in 3 to 12 outer leaves, occasional head completely decayed. Decay in outer leaves.
Origin unknown	1	1 " 100%	Heads at door with 8 to 20 leaves decayed, rest of car 3 to 12 leaves.

Tip burn (Non-parasitic).

Tip burn was reported in the field from Florida, Louisiana, and Texas. In Louisiana this was the most prevalent lettuce trouble in the whole region south of New Orleans, both outer and central leaves being affected.

Table 4. Percentage of tip burn as shown by inspection of cars by the Bureau of Markets, 1919.

Origin of shipment	No. of cars with decay	Percent of decay	Remarks as to seriousness of decay
California	8	3 cars 100% : 2 " 66% : 3 " 2-6%	In all cases slight. All leaves of affected heads bad. Tip burn slight.
North Carolina	1	---	Outer leaves of many heads affected.
South Carolina	1	100%	Tip burn on 3 to 12 leaves of all heads.
	2	1 car 75% : 1 " 20%	Slight. Tips of outer leaves affected.

Downy mildew caused by Bremia lactucae Reg.

This disease has been reported from Texas and New Jersey (In a greenhouse). In Texas, L. R. Hesler found considerable of the disease in fields about San Benito, Harlingen and Mercedes. In one field of 13 acres, almost ready for shipment, 75% of the heads showed from 1-4 leaves moderately affected. At Mercedes another field showed 90% of the plants with from one to all of the leaves affected with mildew. At a distance the whole field appeared brownish. Foggy weather and wet soil favored the disease.

Head rot caused by Botrytis sp.

Louisiana: A very little; loss very small.

North Carolina: (Jehle, C. & T. News Notes, May 17.) Head rot was found in every field visited in Hanover County. Losses varied from one third to one half of the crop. The County Agent estimated that the loss in the county will average about 33%. The trouble seems to be caused by Botrytis cinerea, which is found fruiting in many beds. The disease begins at the tips of the leaves causing them to turn yellow, then brown, and finally a slimy rot follows. Heads may look healthy externally but when opened the tips of interior leaves may be affected. Found on all varieties, and all types of soil.

Texas: (Taubenhaus) Serious this year on account of wet weather; 1/2% loss estimated.

Internal browning (cause undetermined).

California: (Milbrath, C. & T. News Notes, March 1.) "In the Imperial Valley I found cases of a severe disease of lettuce. The outer leaves and head are apparently sound with the exception of marginal browning. The second cycle of leaves is usually normal. Under this cycle the browning increases into the heart. Whether or not this is the same as black heart is uncertain.

Slimy soft rot probably caused by Bacillus carotovorus Jones.

Table 5. Losses from slimy soft rot as shown by market inspection, spring of 1919.

Origin of Shipment	No. of cars with decay	Percent of decay	Remarks as to seriousness of decay
Arizona	1	5%	Some complete decay, mostly confined to 5 outer leaves.
California	27	9 cars 25%+ 18 " 9-18%	In each car all of heads in top layer badly decayed, decay decreasing towards bottom of car. Some heads badly decayed, others decayed to depth of 1 to 8 outer leaves.
Florida	3	3 " 75-100%	Much worthless stock in each car, 35-40% balance of stock 3 to 5 leaves affected.
Maryland	1	1%	Slight decay.
Texas	2	1 car 35%	Decay in 1 or more leaves, occasional head slimy.
Origin unknown	3	1 " 25% 1 " 23% 1 " 100%	Half of decay bad, half slight. One-third complete decay, balance affecting 3 to 5 outer leaves. 20% worthless, 80% affecting 1 to 8 outer leaves.
		1 " 10-12%	Decay only in top layer.

Other diseases.

Leaf spot caused by Cercospora sp. was found in traces in Louisiana but doing no particular damage.

Soft rot caused by Bacillus sp. is reported as quite abundant in Louisiana where it frequently follows tip burn.

Leaf spot of a bacterial nature is reported by Jagger from Sabford, Florida.

Stem rot caused by Rhizoctonia was reported from Louisiana, New Jersey and Texas in slight amounts.

A rusty leaf spot on outer leaves was noted in a car of Florida lettuce. This trouble affected several heads in each hamper.

Various decays and soft rots were found in lettuce from California, Florida, North Carolina, and Texas. The lettuce in some cars was very heavily decayed, usually the heaviest decay occurring at top of load, and somewhat slighter amounts in lower part of load, affecting usually 1 to 5 leaves.

PEAS

Blight caused by Ascochyta pisi Lib.

Blight has been reported from Louisiana, Mississippi, New Jersey and Texas. In Louisiana it was said to be very common, causing some loss. In Texas it was prevalent, but not especially serious; while at Crystal Springs, Mississippi, it was common on both pods and leaves, but causing only a slight to moderate loss in fields.

Root rots caused by various organisms.

Delaware: (Leoato, May 17.) Root rots are causing a great deal of damage in some places in the state.

Louisiana: (Edgerton, June 1.) Very common and quite serious. Considerable complaint from this trouble. Disease killed the plants before they commenced bearing.

New Jersey: (Cook) Very severe, being most abundant in Burlington County where a number of thousand acres are grown.

Other diseases.

A disease thought to be caused by the same organism as that causing streak of sweet peas and other legumes was reported as severe in Delaware and parts of Maryland. The following report is made by L. L. Harter in C. & T. News Notes April 14, "The crop is reduced about 16% by this disease. Whole fields have been completely destroyed and some are being plowed under without harvesting. The peas in this section are grown largely for canning. The first year's crop is generally good but when grown for a second or third year in succession on the same ground the disease becomes much more severe, or so severe that there is an almost total failure. There are numerous lesions and streaks on vines, leaves and pods. These lesions frequently occur near the soil line and in most cases the roots, with the exception of the tap root, are rotted away.

Outside the cambium layer of the tap root the tissue is likewise dead. The leaves first turn yellow, then dry and brown, and finally drop off, followed by the death of the plant."

J. M. LeCato reports the case of a farmer who estimated his loss of seed peas to be about \$9000. He estimated his crop to be cut to 10% because of the trouble described above.

A bacterial blight is reported from Louisiana by C. W. Edgerton as very common and doing some damage, both on leaves and pods.

A disease of a bacterial nature was reported by Hesler from Crystal Springs, Mississippi, as causing some trouble.

A serious disease of garden peas, apparently bacterial in nature, is occurring in parts of the District of Columbia, causing considerable damage. In one garden it is estimated that the yield has been reduced about 90% because of this disease which causes lesions on pods, leaves and more particularly the stems.

POTATO

Late blight caused by Phytophthora infestans (Mont.) DeBary.

Florida: Separate reports of the occurrence of late blight in Florida have been received from Messrs. Jagger, Ankeney, Link and Hesler. It seems that the disease made its appearance somewhat earlier than usual. On March 6 Dr. Jagger found two plants in a three acre field showing primary infection, with secondary infections on a few surrounding plants. The county agent at Hastings reported first seeing the disease on March 4. On March 31, Dr. Hesler reported late blight as present in practically every field and doing rather heavy damage at Hastings and especially at Federal Point. In one field 50% of the plants were seriously affected to the extent of about half of the vines being killed. Another field showed about 40% of the plants moderately blighted and another field of ten acres showed one third of the plants dead. About April 1, Mr. Ankeney reported late blight as general throughout the Hastings potato section. He reported that very few farmers sprayed, and in some cases they had started digging the earliest potatoes because of blight.

Late blight tuber rot was noted in 2 cars of Florida potatoes, in 1 car only any occasional potato affected, in the other car an average of 50% of the potatoes showed effects of late blight. In 2 cars of Louisiana potatoes the average decay from what the inspector called late blight was 8%, part of the affected tubers being completely decayed. Numerous shipments of Florida potatoes have shown considerable soft rot which probably was primarily caused by late blight infection in the field.

Wet weather injury.

Florida: Unusually heavy rainfall during March was responsible for a great deal of damage to the potato crop. Linn reported 25% damage to potatoes in Hastings and Palatka. Hesler reported that growers at Federal Point and Hastings estimated weather conditions and late blight to have cut the yield 50%.

Mosaic (cause undetermined).

Mosaic has been reported this season on potatoes, especially Bliss Triumph, in Alabama, Louisiana, Mississippi, Kansas, Oklahoma and Texas. In Louisiana Edgerton reports that Bliss Triumph showed 90% mosaic and that not so much of the dwarf stage is evident this year as last season, consequently the loss is probably not so great. In the Mobile section, Alabama, the acreage of potatoes this year is greatly reduced on account of poor yields and low prices in 1918. What potatoes are grown there showed marked mosaic (25 to 95%) on April 12.

Early blight caused by Macrosporium solani E. & M.

Reported from Florida, Louisiana, Mississippi and Texas. In Florida it was very abundant as usual and at Federal Point and Hastings it was general, particularly on the older vines. In Texas it was reported as prevalent due to wet weather and causing about 1% loss.

Scab caused by Actinomyces scabies (Thaxter) Gussow.

Table 6. Percentages of scab in shipments of southern potatoes, spring of 1919.

Origin of shipment	No. of cars with scab	Percent of scab	Remarks as to seriousness of scab
California	1	10+	10% bad scab, some additional slight scab.
Florida	11	10 cars 4% 1 " 10%	In all cases scab was deep. Very heavy.
Georgia	3	---	An occasional scabby tuber in all cars.
Louisiana	6	4 " 4% 2 " 20%	Scab deep in all cases. Serious scab.
Mississippi	1	100%	3% bad scab, slight scab on all other tubers.
Texas	17	1 car 60% 4 " 32% 7 " 12% 5 " 5%	Very heavy infection. Serious, some slight. Mostly deep scab. Partly deep scab, partly slight.

Other diseases.

Bacterial wilt caused by Bacillus solanacearum is reported as very prevalent this year in Beaufort County, North Carolina. The average loss on June 9 being about 5% of the plants. In some fields the loss is 15 to 26%.

Sclerotium wilt caused by Sclerotium rolfsii was reported as common in Louisiana, but causing only small losses.

Fusarium wilt caused by Fusarium sp. is reported from Florida as rather general at Federal Point and Hastings, causing a rather high percentage of loss in some cases.

Bacterial decay, much of which was of a slimy, soft type was found in varying amounts in many shipments of southern grown potatoes. Potatoes from the following states were found to be decayed:- Alabama, Georgia, Florida, Louisiana, Mississippi, North Carolina, South Carolina, Texas, and Virginia. The heaviest decay was found in several cars of Louisiana potatoes, most of them running as high as 40% decay. The largest number of shipments came from Florida, about 70 cars with potatoes showing decay ranging from 2% to 35%.

RADISH

Black root rot caused by Aphanomyces sp. = Reosporangium sp. was observed at Long Beach, Mississippi, by L. R. Hesler in one field where 75% of the radishes were badly affected.

White rust caused by Cystopus candidus was common in the 800 acres of radishes grown at Long Beach, Mississippi. This disease and also unfavorable weather are estimated by local men as reducing the crop by 40%.

Slimy soft rot caused by Bacillus carotovorus caused very heavy decay in 46 barrels of radishes from Arkansas, the upper part of many barrels being a mass of decay.

SPINACH

Blight (cause undetermined).

California: (Milbrath, Feb. 8.) A trace of blight found in most fields.

Texas: (Hesler, March 10-12.) All stages of blight were to be found in fields about Austin where approximately 3000 acres of spinach are grown. Probably on the average one third of the crop at Austin is affected and in the cases examined from 5 to 10% of the plants were dead or nearly so. The reduction in yield may be roughly put at 15%. In one field the reduction was from 6000 to 2000 baskets. New soil, which had never grown spinach before, was found showing blighted plants. The trouble does not appear to be confined to any special type of soil, although some claims are made that gravelly soils show blight worst.

The disease was also observed at Mercedes, but only in a portion of the fields and not so general as at Austin.

Anthrachnose caused by Colletotrichum spinaciae E. & H.

Louisiana: Prevalent at Kenner, but doing only slight damage.

Texas: (Hesler, March 12-14.) General about Austin, and found in every field after the plants are half grown. Growers refer to it as "age". At Mercedes it was especially abundant on plants suffering from blight.

Downy mildew caused by Peronospora effusa Rabenh.

California: (Milbrath, February 5 and April 19.) In the Sacramento regions and the Imperial Valley severe cases are evident.

Texas: (Hesler, March 10-12.) Observed on plants grown in Austin, Mercedes, Mission and Dickinson. At Austin the worst case was observed on the variety Bloomsdale (curly). It was found generally, however, in all fields and in many cases stripping of the leaves was necessary. Spinach is planted on the same land year after year which probably accounts for successive reinfections. Probably 75% of the plants at Austin have from two to ten spots on each leaf, especially the lower ones. At Mercedes the fungus was very abundant, causing severe damage in places. Yellow areas on the upper surfaces of the leaves were produced and abundant conidiophores on the lower surfaces. No spraying nor effort to control.

Other diseases.

Leaf spot caused by Heterosporium variable is reported as causing some loss in the Sacramento region of California and as general but not at all serious at Austin, Texas.

Black mold caused by Cladosporium macrocarpum was abundant in a few fields near Mercedes on plants weakened from other causes.

Slimy soft rot was reported in shipments of spinach from California, Maryland, and Texas. The heaviest decay occurred in spinach from California, 1 car with contents completely decayed and a total loss, the other 7 cars with from one-fourth to one-half of spinach decayed and slimy. The spinach from Maryland was badly decayed in parts of car, in other parts free from decay. The decay in Texas spinach was slight in 3 cars, but rather heavy in 1 car which contained many baskets sunken to a slimy mass. This trouble was noted in 2 cars of spinach of unknown origin but did not affect contents.

Watery soft rot, caused by Sclerotinia libertiana, affected 15% of the spinach in a car from Texas.

Soft rot of uncertain cause was reported as causing some losses in shipments of spinach from California, Maryland, Texas, and Virginia, the decay being rather heavy in Virginia and California spinach, some barrels with spinach a sunken and leaking mass.

STRAWBERRY

Leaf spot caused by Mycesphaerella fragariae is reported as being present in about the usual amounts from Louisiana, Michigan, Mississippi, and Texas. In Michigan, because of unusually wet weather, it is thought that it may become worse than usual this year.

Gray mold rot caused by Botrytis sp. is reported as occurring in the field in Louisiana.

Rot caused by Rhizopus sp. has also been noted in the field this season in Louisiana, Mississippi, and Texas.

Below is given a table showing some of the losses in transit caused by these diseases.

Table 7. Losses to strawberry from rots caused by Botrytis sp., Rhizopus sp., and other undetermined causes as shown by inspection of cars by the Bureau of Markets.

Origin of shipment	Gray mold rot		Rhizopus rot		Other decay	
	No. of cars	Percentage of decay	No. of cars	Percentage of decay	No. of cars	Percentage of decay
Alabama	1	-1%	2	5 - 50%	---	---
Arkansas	10	3 cars 10%	6	3 cars 10%	1	2%
		1 " 25%		3 cars 15%		
		1 " 18%				
		5 " 2-5%				
Delaware	1	1-2%	1	50 - 55%	---	---
Kentucky	7	1 car 50%	3	1 car 15%	---	---
		1 " 35%		1 " 25%		
		5 " 20%		1 " 75%		
Louisiana	3	3 " 20%	3	1 " 15%	1	40%
				1 " 3%		
				1 " 20%		
Maryland	---	---	1	25%	---	---
Missouri	4	2 cars 15%	2	1 car 25%	1	18%
		2 " 6%		1 " 15%		
North Carolina	4	4 " 15%	1	6%	---	---
Ohio	1	- 1%	1	15%	---	---
Tennessee	7	5 cars 10%	3	2 cars 40%	3	1 car 12%
		1 " 2%		1 " 5%		1 " 40%
		1 " 25%				1 " 3%
Origin unknown	1	45%				

TOMATO

Wet weather injury.

Tomatoes as well as other crops were badly injured by excessive rainfall in parts of Florida during March. Reports of the damage are available from Messrs. Meier, Rosenbaum, Clark and Ankeney. The following report of the general situation is furnished by Dr. Rosenbaum:

"On March 14 there occurred a heavy down-pour of rain which continued for thirty hours. During the twenty-four hour period, ending in the morning of March 15, nine inches of rain fell. Not only was the precipitation great but the water remained flooding the fields for many hours after the rain. The losses occurred by direct drowning of the plants and by favoring the development of rot producing organisms. The losses were heaviest in Brevard County and in the northern half of Dade, where it is estimated that about 8000 acres of tomatoes were planted. The losses in these two counties was approximately 60%."

Early blight caused by Macrosporium solani E. & M.

Florida: Notes on the losses from early blight are available from Messrs Rosenbaum, Meier, Link, Ankeney, and Clark. This disease was widely distributed as usual on leaves and fruit and did great damage to the tomato crop. According to Dr. Rosenbaum it can unhesitatingly be said that this caused more loss than any other tomato disease in Florida this year.

Florida tomatoes examined on the city market in New Orleans showed considerable nailhead spot. Frequently 95% of the tomatoes from Florida showed several nail heads. Cuban shipments showed relatively little as compared with those from Florida.

Louisiana: Seven percent reduction in yield in fields near Arabi according to E. V. Hollis.

Table 8. Percentage of early blight or "nailhead spot" as shown by inspection of cars by the Bureau of Markets.

Origin of shipment	No. of cars with decay	Percentage of affected fruit	Remarks as to seriousness of infection
Arizona	1	5-8%	Usually 1 or 2 spots to the tomato.
Florida	116	24 cars 28% 52 " 3-5% 40 " 10%	From 3 to 10 spots, some more. Usually 2 spots, occasionally more. Mostly 3 to 8 spots.
Louisiana	1	90%	Very badly spotted.
Mississippi	1	----	Occasional tomato slightly spotted.
Texas	3	2 cars 6%	Very badly spotted.
Mexico	7	3 " 3% 4 " 10%	Slight spotting. Tomatoes in 3 cars slightly spotted. in the other car severe.
Unknown origin	1	----	Occasional tomato with 1 or more spots.

Fusarium wilt caused by Fusarium lycopersici Saco.

Florida: Slight amounts were reported by W. B. Clark March 29 and W. N. Ankeney April 13. Not over 1/2% of the plants were affected.

Louisiana: Traces found in seed beds at New Orleans March 24 by L. R. Hesler.

Mississippi: Trace observed at Crystal Springs April 18. Plants were too young to show the trouble at that date.

North Carolina: (Jehle, April 26 and May 3.) Growers in Lenoir and Sampson Counties report considerable trouble with wilt.

Leaf blight caused by Septoria lycopersici Speng.

Observed in Florida, Mississippi and Louisiana in very slight amounts.

Phoma rot caused by Phoma destructiva Plowr.

Florida: Phoma rot was common on ripe fruit in the fields but not causing serious losses. The greatest damage from this disease occurs to fruit in transit.

Florida tomatoes observed in the city market at New Orleans were affected with Phoma rot. It was also noted as being so abundant on Cuban tomatoes that 25 to 50% of the fruits were discarded.

Table 8. Losses from Phoma rot as shown by inspection of cars by the Bureau of Markets.

Origin of shipment	No. of cars with decay	Percentage of decay	Remarks as to seriousness of rot
Arizona	2	1 car 3%	Slight spotting.
		1 " 17%	Uniform throughout load.
California	1	7%	-----
Florida	156	2 cars 85%	Badly decayed.
		16 " 34%	Mostly bad decay, in large spots.
		46 " 10-15%	Numerous spots of decay.
		92 " 2-7%	Mostly in small spots and associated with other rots.
Louisiana	2	1 " 11%	Slight decay in spots, come complete.
		1 " 40%	Decay in spots, slight.
Mississippi	1	---	Occasional tomato affected.
Missouri	1	1 30-40%	-----
Texas	7	3 cars 10%	Associated with soil rot and Rhizopus.
		4 " ---	"Some Phoma rot". No estimate given.
Cuba	2	1 " 2%	-----
		1 " 9%	Slight, small spots only.
Mexico	21	8 " 15%	Usually associated with other rots.
		13 " 3-8%	" " " " "

Buckeye rot caused by Phytophthora terrestris Sherb.

Florida: (Rosenbau, C. & T. News Notes, March 29.) All fields about Miami showed exceptionally heavy infection of buckeye rot. This was on account of the unusually heavy rains. In one field there were 66% diseased fruits by actual count. One grower who had hired special labor for picking the fruit on the day following the rain and immediately packed more than 500 crates was compelled to repack all of these on account of the development of Phytophthora rot. Less than one third of these crates were saved.

Blossom drop (cause undetermined).

Florida: An unusual amount of drop of blossoms occurred about Moore Haven, Ft. Myer, Larkin, and along the East Coast causing considerable loss in quantity and earliness.

Soil rot caused by Rhizoctonia sp.

Soil rot was more abundant than usual this year in Florida on account of the excessive rains. The following table gives an indication of the damage it incurred in transit.

Table 9. Percentage of soil rot caused by Rhizoctonia sp. as shown by inspection of cars by the Bureau of Markets.

Origin of shipment	No. of cars with soil rot	Percentage of decay	Remarks as to seriousness of decay
Arizona	1	5-25%	Associated with Phoma rot.
Florida	52	15 cars 21% ; 37 " 3-10%	In a few cars complete decay, in others associated with other rots. Usually associated with other rots.
Louisiana	1	---	Occasional tomato affected.
Texas	9	3-12%	Usually bad decay and associated with Phoma and Rhizopus rot.
Cuba	2	4-5%	Mostly complete decay in each car.
Mexico	21	9 cars 13% ; 12 " 2-10%	In all cases these percentages represent losses from soil rot, Phoma Rhizopus rot, and other rots, no estimate of the exact amount of soil rot being given.

Mosaic (cause undetermined).

Florida: (Ankeney, C. & T. News Notes, April 12.) Twenty acres of tomatoes in the Ft. Myer section were affected so badly that it is doubtful if they will make even a poor yield.

(Link, C. & T. News Notes, March 22.) By far the most serious situation about Moore Haven and Ft. Myer is due to mosaic, which is very bad indeed. The growers do not know what it is and claim that it has been ruining their tomato industry.

Other diseases.

Leaf curl (none-parasitic) was reported as moderate and general in all tomato fields about Magda, Louisiana.

Yellowing of the leaves at the tip and between the veins was reported from a field in North Carolina. It is thought that this trouble is due to malnutrition. The grower said it was worse earlier in the season.

Nematode injury was reported from Moore Haven and Ft. Myer, Florida.

Brown ring spot, cause undetermined, which was found last fall in California, was also abundant on both green and ripe fruit in a car of tomatoes from Mexico.

White spot, cause undetermined, was observed by Milbrath in a carload of Mexican tomatoes affecting about 15% of the fruit.

Rot caused by Diplodia sp. was found on two different occasions on tomatoes from the Bahama Islands. The decay progresses rapidly and is very destructive according to F. C. Meier.

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THE PLANT DISEASE BULLETIN

Issued By

The Plant Disease Survey

VOLUME III.

NUMBER 2

July 1, 1919

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

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APPLE

Scab caused by Venturia inaequalis

Arkansas: (Elliott, July 1.) Bad on unsprayed fruit, 1% total loss. Well controlled in commercial orchards.

Colorado: (Leach, July 1, 1919.) None observed to date. Will probably show up later.

Connecticut: (Clinton.) Not many complaints yet. Looks as if it would cause more trouble than last year. Have seen crab-apples badly infected.

Delaware: (LeCato, July 17.) Very common on early varieties in spite of vigorous spraying.

Georgia: (Berry, July 1.) Common through apple growing sections of north Georgia. Resulted in considerable blossom blight. Damage to crop will probably be as heavy as last season.

Idaho: (Hungerford, July 15.) No scab noted anywhere in southern Idaho during an extended trip through that region during June. Rather severe attacks, however, in unsprayed orchards at Sand Point, Coeur de Elene and Moscow in the northern part.

Illinois: (H. W. Anderson, July 1.) Scab appeared unusually early this season. In central Illinois it was abundant on the leaves as early as May 3. Ascospore discharge in the open was vigorous on April 12, 13, and 14.

The disease is bad throughout the state and has caused exceptional foliage injury and combined with unfavorable weather has caused an unusual leaf drop. Sprays following early scab infection caused severe burning.

Indiana: (Gardner, August 1.) Most severe apple disease in the state this year. Indiana suffered an especially bad epidemic due to the prolonged rains at blossoming time. Although the blossoms and young fruits suffered much injury later infection of the older fruits was not as bad as might be expected. Unsprayed orchards were much more severely infected than sprayed.

Iowa: (Melhus & Bakke). General and very severe. Indications are that apples will suffer more than during any of the last three years. Recommending extra application of Fordeaux mixture.

Kansas: (Melchers, July 1.) Very prevalent on foliage. Infection on fruit is anticipated heavy.

Kentucky: (Miss Roe) Fairly prevalent. No reports of serious loss therefrom.

Maine: (Morse, July 1.) Very extensive and severe development of scab on both sprayed and unsprayed trees early in June, although much worse on the latter. Limited observations seem to indicate that there has been very little increase since that time. In fact conditions on July 1 were decidedly better than on June 10 as the development of scab since that date has by no means kept pace with the production of new growth. On the latter the later applications of sprays have given material protection.

Michigan: (Coons, July 1.) Exceedingly prevalent, spraying not effective. Leaves show more primary infection than common. In spite of dry weather expect enormous scab losses.

Minnesota: (Stakman, July 8.) "Apple scab is unusually severe this year. It is almost universally present on leaves and on the young fruit. It attacks some of the young fruit so early as to destroy it and the weather conditions were such as to make it practically impossible to make a second spray application in time. This accounts for the large amount of scab in sprayed regions."

New Hampshire: (Cutler, July 1.) Moderately abundant.

New York: (Chupp, July 1.) More severe than usual. Reported from 12 counties, first appeared about April 21. 3 to 90% pedicel infection. Early plowed orchards gave best control. Orchards thoroughly sprayed with "pink spray" are very clean. Growers who applied the delayed dormant spray had fairly good scab control.

Ohio: (Selby, July 1) More prevalent than usual. May be said to be general over the whole state. Seriously attacking foliage and fruit of susceptible varieties that were not sprayed. Good control secured where pre-blossom spray Bordeaux mixture was used. Period of cold, rainy weather in May greatly favored the scab.

Oklahoma: (Learn, July 1.) I found this June 15, the first time it has been reported for Oklahoma. Since then I found it on some apples we bought. As to its prevalence I am unable to say at present.

Oregon: (Barss, July 1.) Severe outbreak in June. Hardly any showed up earlier in season. Due to a spell of damp weather the scab developed very rapidly for a short time.

Pennsylvania: (Orton, July 1.) First infection observed May 12 at Arendtsville, Adams County. The disease has appeared generally throughout the state and the most serious outbreak we have seen in several years. Wet, cool weather prevailed at critical time and deterred many from spraying when they should. One hundred percent infection in orchards in Cumberland, Huntingdon and Centre counties. Estimate 10% loss in Schuylkill, Luzerne, Berks, Potter and Crawford Counties, Stayman, Delicious, Gano, Winter Banana, Jonathan and King severely infected. Grimes and Star also more severely infected than usual. Transparent shows 10% infection.

Tennessee: (Essary, July 1.) Very heavy infection, loss serious, especially on unsprayed orchards.

Vermont: (Lutman, July 1.) Less than usual, hot, dry June gave little chance of infection.

Virginia: (Fromme, July 1.) Unusually severe this year. Reported June 3 from Augusta County, heavy at Blacksburg and throughout southwestern Virginia, also in Shenandoah Valley from Staunton to Winchester. Many growers in the Valley did not recognize the trouble as they have had very little in recent years and do not apply the pink spray.

Washington: (Heald, July 1.) Very common and severe in Western Washington. Rainy and cool up to June 15. Cool but rather dry in eastern Washington and consequently but little scab.

West Virginia: (Giddings, July 1.) A far more general infection than usual, quite prevalent in the apple growing section of the Eastern Panhandle. Serious in the Kanawha and some sections of the Ohio Valleys.

(Eerg, July 14.) One of the most important diseases in the state. In Berkeley County the disease was confined to the foliage mostly.

Wisconsin: (Vaughan, July 1.) More scab than for several seasons, especially severe where no spraying has been done. Reported from five counties. Noted on petals of flower for first time by Dr. Keitt in Door County.

Fire blight caused by Bacillus amylovorus

Alabama: (Peltier, July 1.) Fire blight has been extremely severe this season on apples and pears. In the station orchard, Jonathan seems especially susceptible.

- Arizona: (Brown, July 1.) Reported this week from the Salt River Valley, nearly every apple tree being attacked. An entire loss of the crop is predicted in this district.
- Arizona: (Brown, July 1.) Only one case of fire blight reported.
- Arkansas: (Elliott, July 1.) Fairly severe on Jonathans, especially bad in the southern part of the state, but less so in the commercial apple growing section.
- Connecticut: (Clinton.) No complaints yet. Probably less conspicuous than last year.
- Colorado: (Leach, July 1.) Observed in Montezuma County June 24 and at Littleton, June 3 (slight). Very prevalent on western slope.
- Georgia: (Berry, July 1.) Especially severe this season. Resulted in from 5-100% death of new growth. Less severe in extreme mountain counties.
- Illinois: (Anderson, July 1.) No blossom blight so far as observed. Some twig blight but not doing damage to date.
- Iowa: (Bakke) Localized in the southern half of the state. Not severe. Much less than in the last three years.
- Idaho: (Hungerford, July 15.) Reported from nine counties in the southern part of the state. Only a trace noted at Moscow. Many old orchards in the southern part of the state where orcharding has been given up, that are very badly diseased. What appears to have been a very severe attack of collar blight and root rot about five years ago has killed a large percentage of trees in Boise Valley and adjacent regions. Reports of this rather hard to follow but appear to be blight.
- Kansas: (Melchers, July 1.) No more prevalent than usual. There were less injuries than for past seasons.
- Louisiana: (Edgerton, July 1.) Have seen a little. Very few apples grown in the state.
- Maine: (Morse, July 1.) Not reported nor observed.
- Massachusetts: (Osmun, July 1.) Loss moderate.
- Michigan: (Coons, July 1.) None seen this year. Aphids were exceptionally scarce early in the season. Would refer to reports of last two years which show practically no fire blight loss. Believe bacteria were killed by hot seasons of 1917 and 1918.
- Minnesota: (Bisby, July 1.) Reported from six counties during May and June. In Ramsey County it was said to be considerably more abundant than last year.
- Mississippi: (Beal, July 1.) Very general in the state this season. Heavy twig blight infection. On pears the twig infection is especially heavy and general.
- New Hampshire: (Butler, July 1.) Scarce.
- New York: (Chupp, July 1.) Prevalent locally, damage moderate. Reported from three counties.
- Ohio: (Selby, July 1.) Very slight occurrence in state. Reported from Lawrence County in restricted area on apple and pear, and collected on apple and pear in Athens County. This slight infection is thought to be due to the killing of blossom clusters by serious freezes of April 25 and 26.
- Oklahoma: (Learn, July 1.) This disease is not so bad as would be expected from weather conditions. It has been reported, but is not prevalent.
- Pennsylvania: (Orton, July 1.) Locally distributed so far as we have data. Average infection about 1-2%, but not serious anywhere this year. First infection reported May 20, in Franklin County.

- Tennessee: (Essary, July 1.) Common but not serious.
Texas: (Taubenhaus, July 1.) Very prevalent, 10% loss.
Vermont: (Lutman, July 1.) Seen locally and reported from a large orchard at Bennington, Vermont. Occasional infections seen locally not serious, but reported as serious at Bennington.
Virginia: (Fromme, July 1.) Severe in Piedmont Section, particularly in Albemarle County. Slight to moderate in Montgomery and Roanoke Counties.
Washington: (Heald, July 1.) Reported from White Salmon District, Walla Walla and Yakima Valley. Not so serious as in former years.
West Virginia: (Giddings, July 1.) Not observed as causing serious injury on apple in any commercial orchards this year.
Wisconsin: (Vaughan, July 1.) More prevalent than usual, especially bad on crab, wild hawthorne and Wealthy. Reported to eleven counties.

Black Rot caused by Sphaeropsis malorum.

- Arkansas: (Elliott, July 1.) First rotted fruit found June 10, variety Red Astrachan, probably not serious. Foliage infection very general and in places severe.
Indiana: (Gardner, August 1.) Infection on the leaves was especially severe throughout the state due to the prolonged wet weather. The disease also affected the calyx and of immature fruits of certain varieties.
Iowa: (Bakke) Prevalent on leaves in unsprayed orchards at Osage June 11 and Wapello, June 16.
Kansas: (Melchers, July 1.) More prevalent than usual on foliage.
Maine: (Morse, July 1.) Apparently is quite common on unsprayed trees, but this conclusion is not based on extensive observations covering widely separated sections.
Mississippi: (Beal, July 1.) Reported in Webster County. Heavy infection of limbs and leaves on material sent in from above county. The disease is probably widespread but has not been reported.
New York: (Chupp.) Leaf spot and canker, caused by Physalospora cydoniae, is reported as general but not severe and causing moderate damage. Reduction in yield in Wayne County annually is 10-50%.
Pennsylvania: (Orton, July 1.) First infection seen at State College May 25. This disease is spreading rapidly in Centre, Franklin and Cumberland Counties. Infection rather general and undoubtedly of wider distribution than this report signifies. No infection on fruit yet seen.
Virginia: (Fromme, July 1.) Very severe this year and apparently general throughout the state. Appeared unusually early and should cause considerable defoliation, and cut size and quality of fruit. First reported from Petersburg April 21.
West Virginia: (Giddings, July 1.) Leaf spot quite prevalent in most sections of the state. No evidence of black rot as yet.

Cedar Rust caused by Gymnosporangium juniperi-virgininae.

- Arkansas: (Elliott, July 1.) Quite severe all over the state, more so than usual. All apples show some infection.
Georgia: (Berry, July 1.) Reported from all parts of apple section. As high as 25% of leaves infected. Has not yet appeared on fruit.
Iowa: (Bakke.) Pycnia of aecidial stage first found June 11, at Osage.
Kansas: (Melchers, July 1.) Less prevalent as a whole than usual. Attack confined to the apple foliage.

- Louisiana: (Hollis.) Prevalent locally in Lafayette County. Damage slight. Traces noted on six trees. Very few trees in parish.
- Minnesota: (Eisby, July 1.) Reported from many localities, quite general in southern part of the state.
- New York: (Chupp, July 1.) Prevalent locally, damage slight. Reported from three counties.
- Pennsylvania: (Orton, July 1.) First reported June 14 on New York Imperial, infection general.
- Virginia: (Fromme, July 1.) This promises to be another severe cedar rust year for localities where cedars have not been eradicated. Reported from Shenandoah, Rockbridge, and Greenville Counties. Sixty percent of foliage infected May 28 on an eighty acre orchard at Lexington.
- West Virginia: (Giddings, July 1.) Destructive locally, but not serious in the principle apple growing section of the state, The destruction of red cedars is being carried on as in previous years.

Bitter rot caused by Glomerella cingulata.

- Arkansas: (Elliott, July 1.) Some bitter rot on Early Harvest and Yellow Transparent. First appeared June 25 on Early Harvest. Not reported as serious.
- Delaware: (LeCato, May 27.) Reported as causing slight damage.

Blotch caused by Phyllosticta solitaria.

- Alabama: (Peltier, July 1.) Apparently rather early this year and no doubt will be quite severe.
- Indiana: (Gardner, August 1.) Especially prevalent in the southern and central part of the state. North Western Greening and Starke suffered more than other varieties. The disease was fairly well controlled by the summer spray of Bordeaux.
- Mississippi: (Hesler, April 16-26.) Abundant in home orchard on twigs. Crystal Springs. Young spots just beginning to show on foliage.
- Ohio: (Selby, July 1.) Collected in Washington and Lawrence Counties about June 10, Athens County on foliage June 13. Apparently early and serious in its attacks.
- Oklahoma: (Learn, July 1.) This has come in from several localities so far, and from observations I have made it promises to be as usual the worst of apple diseases, however, it is too early to make a definite report.
- Tennessee: (Essary, July 1.) Very common in all sections. Damage serious in unsprayed orchards.
- Virginia: (Fromme, July 1.) Well developed at Burkeville June 18, localized on an occasional tree.

Brown rot caused by Sclerotinia sp.

- Alabama: (Peltier, July 1.) Brown rot is apparently general throughout the state. This is the first season it has been reported so general and severe.
- Arkansas: (Elliott, July 1.) A few specimens on Red Astrachan early in June. Not of much importance.
- Washington: (Heald, July 1.) Twig and blossom blight due to Sclerotinia sp. reported from a number of localities by Frank. (Island and Whatcom Counties.)

Powdery mildew caused by Podosphaera leucotricha.

Idaho: (Hungerford, July 15) Rather common throughout the state, but not doing serious damage except in few instances.

Oregon: (Barss, July 1.) Showing up abundantly, especially in unsprayed young orchards.

Pennsylvania: (Orton, July 1.) Appeared May 20 at State College in Gravenstein, infection not serious.

Washington: (Fisher, June 1.) General, damage very severe in some orchards, especially on Jonathans and Rome Beauty. Many orchards that were severely mildewed in 1918 are barren this year. Where early spraying with lime-sulfur was done the disease has been checked, but most growers delayed too long.

(Heald, July 1.) Common in western Washington and in the central irrigated regions. Reported to be on the increase in the Yakima Valley. A considerable amount of Sherwin-Williams dry lime-sulfur has been used here.

Frost injury.

Connecticut: (Clinton.) Late frosts in May apparently hurt the blossoms considerably in certain localities and orchards, so that the crop is light in places and fair in others.

Illinois: (Anderson, July 1.) There has been an unusual amount of leaf yellowing and dropping this season. There was a frost with temperatures of 24-30° throughout the state April 26-27. The apples were in full bloom in central Illinois at this time. This was followed by good growing weather until the week of May 19-24, when there were several days of cold, rainy weather. This was followed by warm, dry weather. The older leaves suffered most. The condition was noticed on other fruits also.

Indiana: (Gardner, August 1.) Very severe. In the southern part of the state, peculiar scarred areas about the calyx end and the familiar "frost band" was common while in the northern part in many cases the frost resulted in total destruction of the blossoms so that no fruit will be set.

Ohio: (Selby, July 1.) Completely encircled Gano apples were received from Lawrence County, June 25. Described as worse on Gano variety in elevated situation where cold appeared more severe in that district. Difference referred to fog protection in valleys.

Pennsylvania: (Orton, July 1.) Foliage severely injured at Phoenixville, Pennsylvania, 20% of foliage showing marked blisters. Sent in May 5.

Washington: (Heald, July 1.) Frost blistering and curling of leaves is very common throughout the state. Has been noted in western Washington, the Yakima Valley and in eastern Washington. Much young fruit killed by the late frosts, especially in eastern Washington.

West Virginia: (Giddings, July 1.) Foliage on many varieties were injured by late frosts causing partial death of the leaf tissues.

The cold weather prevailing during blooming time resulted in much injury to the blossom. This was apparently not due to the frost, but to the cold, windy weather. Fruit set is comparatively light as a result.

Spray Injury.

Ohio: (Babcock, June 19.) "I have noticed some damage from the use of the spray gun on apple foliage and the leaves on some of the trees were burned to an extent of probably 75%. The conclusion was that the operator had manipulated the gun too close to the foliage."

Anthracnose caused by Neofabresa malicorticis.

Washington: (Frank, July 8.) In the vicinity of Puyallup this disease is generally prevalent and quite severe this season. More of the trouble is present this year than in the last three seasons. The trouble is spreading into many of the young orchards rapidly and is doing much damage. No injury is done by the fungus girdling small limbs. In some cases the trunk of small trees is encircled. Many new cankers are present on one year old wood. Cankers were found giving off spores June 11, 1919 and also July 7, 1919.

The disease is very severe, also in the regions around Bellingham, Ferndale and Linden. Many of the older orchards there have had the trouble for as long as 16 years or more. One orchard was seen which was reputed to have had the "worst case in the northwest". The owner had sprayed last season and this spring there were no new cankers to be found. The trouble is more prevalent in that area than last year.

Some disease was also present about Vancouver and nearby points, but not so abundant as at the other places mentioned.

Other diseases.

Rosette was noted by Hungerford in nearly every section of Idaho visited this spring. Appears to be worse with clean cultivation. Very clearly associated with soil conditions. Spots of hard pan or soil badly baked due to water standing in orchards under clean cultivation seem to almost invariably produce rosetted trees. This does not appear to be the only factor involved, however.

Root rot, probably caused by Armillaria sp., is reported from Wayne and Monroe Counties in New York as being prevalent locally and causing slight damage.

BEAN

Anthracnose caused by Collétotrichum lindemuthianum.

Alabama: (Peltier, June 15.) Scattering reports received from different sections of the state. Not serious.

Arkansas: (Elliott, July 1.) Rather serious, loss not estimated.

Colorado: (Leach, July 1.) Not yet showing. Too early and too dry.

Georgia: (Berry, July 1.) Reports of 5% damage from several counties, especially in regions of heavy rainfall. All reports from home gardens.

Louisiana: (Edgerton, June 15.) Considerable anthracnose this year. Disease rather severe in some localities. In localities where farmers are beginning to save their own seed, practically no loss this year.

Maine: (Morse, July 1.) Season has been very dry since beans came up and hence, so far, has been unfavorable for the disease. No specimens have been received from correspondents and very little anthracnose has been seen on beans in the field. This is a marked contrast with the two or three preceding seasons.

Michigan: (Coons, July 1.) No reports as yet. August 15 a better date.

Minnesota: (Bisby, July 1.) Heavy infection on stringless pod bean at University Farm, Ramsey County June 6. Other varieties less severely attacked.

Mississippi: (Beal, June 15.) Very general over state. Infection varies from slight to 5-10% of crop.

New Hampshire: (Butler, July 1.) Present in nearly all fields, too early to estimate effect on yield.

Texas: (Taubenhaus, June 15.) Prevalent due to wet weather. Very bad on snap beans.

Tennessee: (Essary, July 1.) Infection general but light.

Vermont: (Lutman, July 1.) Much less than usual at this season, due to dry, hot weather.

Virginia: (Fromme, June 15.) Severe in vicinity of Blacksburg, excessive rainfall contributing.

West Virginia: (Giddings, July 1.) Some plants showing injury from anthracnose have been observed, but I do not know the extent of injury this year.

Wisconsin: (Vaughan, July 1.) Prevalent in some gardens about Madison. Noted cotyledon infection, also on leaves in pathological garden. Most gardens look good.

Blight caused by Bacterium phaseoli.

Florida, Vicinity of Moore Haven and Ft. Myers: (Link, C. & T. News Notes, Mar. 22.) "Beans show a very heavy infection of blight. The greasy or translucent lesions were very abundant on the leaves of the plants in most fields."

Georgia: (Berry, July 1.) Reported from several sections. Often accompanied by root injury. Individual fields show as high as 50% injury.

Indiana: (Gardner, August 1.) Found quite generally throughout the market gardening section around Indianapolis. Drought and blight have reduced the crop materially.

Louisiana: (Edgerton, June 15.) Infection severe. Common everywhere and doing considerable damage.

Minnesota: (Bisby, July 1.) Only slight amounts seen as yet.

New Hampshire: (Butler, July 1.) Scarce.

Tennessee: (Essary, July 1.) Common and severe in most sections on early beans.

Texas: (Taubenhaus, July 1.) Very prevalent, 3% loss.

Virginia: (Fromme, June 15.) Beginning to appear in vicinity of Blacksburg.

Wisconsin: (Vaughan, July 1.) Small amount in gardens about Madison.

Mosaic cause undetermined.

Alabama: (Peltier, June 15.) Scattering in the vicinity of Auburn.

Arkansas: (Elliott, July 1.) Not observed this year.

Colorado: (Leach, July 1.) Observed in several gardens in Fort Collins during first week of July, evidently occurred before July 1.

Georgia: (Berry, July 1.) Several reports from Central Georgia. Not serious.

Idaho: (Hungerford, July 1.) Beginning to appear in commercial fields and gardens. Very serious last year.

(McClintock, June 15.) Less than 1% to date.

Louisiana: (Edgerton, June 15.) Some of the disease, but loss very small.
Maine: (Morse, July 1.) Not reported nor seen.
Minnesota: (Bisby, July 1.) Not uncommon in Ramsey County.
Mississippi: (Beal, June 15.) Found 33% in field near Crystal Springs, Copiah County. Probably quite general.
Tennessee: (Essary, July 1.) General but not serious.
Texas: (Taubenhaus, June 15.) Scattered, unimportant as yet. Noticed it on late planting of Kentucky Wonder beans.
Found on fall beans July 1, but not prevalent.
Vermont: (Lutman, July 1.) Not observed.
Virginia: (Fromme, June 15.) Slight at Blacksburg. Also seen at Holland.
Wisconsin: (Vaughan, July 1.) Few plants having mosaic have been seen. None reported.

Rust caused by Uromyces appendiculatus.

Reports received from twelve states indicate that July 1 is somewhat early for the occurrence of rust. In the southern states of Louisiana and Texas the disease is just coming on; in the northern states practically no rust has shown up as yet.

Stem rot caused by Fusarium sp., Rhizoctonia sp., etc.

Alabama: (Peltier, June 15.) Stem rot observed in the vicinity of Auburn. Quite bad in some of the home gardens.
Arkansas: (Elliott, July 1.) One report loss not determined.
Colorado: (Leach, July 1.) One report received claiming considerable damage. Specimens rather severely infected.
Georgia: (Berry, July 1.) Stem rot accompanied by root maggot injury is common this year. Such plants usually blight badly.
Idaho: (Hungerford, July 1.) Reported and specimens sent from Twin Falls and Moscow.
Louisiana: (Edgerton, June 15.) A very heavy infection this year. Rhizoctonia has been particularly bad. This is probably due to the very wet spring that we have had.
Michigan: (Coons, July 1.) One report from Bay County. Rhizoctonia responsible.
Minnesota: (Bisby, July 1.) Found in Carlton County in June.

PEACH

Leaf curl caused by Exoascus deformans.

Alabama: (Peltier, June 15.) Quite severe in some of the orchards in North Alabama. In one home orchard caused considerable defoliation.
Arkansas: (Elliott, July 15.) Generally distributed.
Connecticut: (Clinton, June 15.) Apparently very little this year as we have had absolutely no complaints and have seen no conspicuous injury.
Delaware: (Manns and LeCato, April 29.) Very severe this season. Damage in some unsprayed orchards runs as high as 50%. Even in some of the orchards that were sprayed there is some loss.

- Georgia: (Berry, June 15.) Very severe this spring. Made its appearance about April 10. Resulted in total defoliation of many home orchards. Often 5% infection in well cared for orchards. Worst season in many years.
- Indiana: (Gardner, June 15.) Especially bad in this state this spring. The disease was spread quite generally throughout the state.
- Iowa: (Bakke, June 15.) Common in southeastern Iowa.
- Kansas: (Melchers, June 15.) Very prevalent on foliage. Spring cool and wet.
- Maryland: (Temple, July 15.) Worst in years. Dormant dusting with sulfur dust has not given control. Dormant spraying with commercial lime-sulfur after buds began to open has not given control.
- Massachusetts: (Osman, June 15.) Severe in some orchards, but controlled for the most part by dormant spraying. One case of fruit dropping caused by this disease; orchard was not sprayed.
- Michigan: (Coons, June 15.) Common everywhere. Very severe. Loss figures not available. Spring very cold and wet.
- New York: (Chupp, June 15.) General and severe in Monroe and Wayne Counties where there is some disease in every orchard, even where sprayed. One orchard sprayed last fall with copper sulphate solution (2 lbs. to 50 gals.) showed no control.
- In Tompkins County it was serious on fairly resistant varieties as well as on susceptible ones.
- Ohio: (Fabcock, June 19.) Very serious this year in the northern part of the state.
- Pennsylvania: (Orton, June 15.) Worst epidemic seen since 1917 and possibly earlier. First observed May 8 in Cumberland County, and May 13 in Centre County. Infection general throughout the state and loss considerable. 10-25% defoliation.
- Texas: (Taubenhaus, June 15.) Not prevalent, little loss, 1/10 of 1%. Many now control it by one spraying with lime sulfur.

Brown rot caused by Sclerotinia cinerea.

- Alabama: (Peltier, June 15.) Prevalent throughout the state. Reported at Atmore, May 26 and Auburn, May 30.
- Arkansas: (Elliott, July 15.) Some sections bad; perhaps 5% total loss.
- Connecticut: (Clinton, June 15.) Too early to predict as injury here occurs chiefly at ripening time, if rainy or foggy. No complaints.
- Delaware: (LeCato, C. & T. News Notes, May 17.) Brown rot very severe in some localities, especially in the old orchards.
- Georgia: (Berry, June 15.) Showing in many orchards. Many mummies carried over from last season. If rainy weather continues will result in heavy loss, especially in home orchards. Peaches on market show considerable rot.
- Iowa: (Bakke, June 15.) Not observed.
- Louisiana: (Hollis.) General over the state, causing moderate damage. No spray used in Jefferson Davis County, 50% infection.
- Maryland: (Temple, July 15.) Was very destructive to peach blossoms and twigs in early spring, as much as 90% of blossoms being killed by Sclerotinia in at least one case.
- Massachusetts: (Osman, June 15.) Twig infection has been severe in a few orchards. A number of cases of severe rotting of plum fruit have been reported, but the disease has not been observed on fruit of peach this year.
- Michigan: (Coons, June 15.) Not reported as yet.

- New Jersey: (Cook, May 16.) Severe outbreak of brown rot through the southern half of New Jersey. Most severe in the vicinity of Vineland.
- New York: (Chupp, June 15.) Reported as general and severe in Wayne County, and moderate in Monroe County.
- Pennsylvania: (Orton, June 15.) Average of 5% loss in Luzerne, Huntingdon and Schuylkill Counties. First infection seen May 25 in twigs at Middletown.
- Tennessee: (Essary, July 15.) Common and severe in most sections, especially where there has been much rain, as in the middle and western sections.
- Texas: (Taubenhaus, June 15.) Very prevalent in unsprayed orchards, 3% loss.

Black spot caused by Bacterium pruni.

- Arkansas: (Elliott, July 15.) Serious in some poor soils, 1/2% damage.
- Alabama: (Peltier, June 15.) Scattering reports sent in. Disease not serious.
- Connecticut: (Clinton.) Evidently not conspicuous as have had no complaint and have seen no infections yet.
- Georgia: (Berry, June 15.) Reports of small amounts from various home orchards.
- Indiana: (Gardner, June 15.) Of great economic importance in Indiana this year, causing the characteristic shot-hole effect on the leaves and cankers on the limbs.
- Mississippi: (Beal, June 15.) Present in the state. Several cases observed in southern part of state where damage was slight.
- Texas: (Taubenhaus, June 15.) Prevalent, 1% loss.

Scab caused by Cladosporium carpophilum.

- Alabama: (Peltier, June 15.) General throughout the state. Disease slight to bad. All fruit now coming into the market more or less scabby.
- Arkansas: (Elliott, July 15.) Bad where spraying is not done, 1% loss.
- Connecticut: (Clinton, June 15.) Too early to tell about this trouble. No complaints to date.
- Georgia: (Berry, June 15.) Scab less plentiful than usual. Home orchards most affected. Commercial orchards quite free.
- Mississippi: (Beal, June 15.) Very general in the state on fruit and limbs. Infection varies from slight to very heavy.
(Hesler, April 18-26.) Very abundant on last year's growth. None on fruit to date (April 20.) Generally prevalent over portion of state visited.
- Pennsylvania: (Orton, June 15.) Locally present in Blair, Berks, Cumberland, Huntingdon and Schuylkill Counties. Cannot estimate damage at this time.
- Tennessee: (Essary, July 15.) Common and severe in some sections.
- Texas: (Taubenhaus, June 15.) Prevalent, 1% loss.

Other diseases.

Crown gall caused by Bacterium tumefaciens was reported from Georgia in a number of instances. Much of the nursery stock in the state or coming into the state from neighboring states is infected. One nursery has at least 50% affected trees.

Yellows and rosette were reported from several sections in the state of Georgia as causing the death of a number of trees.

Root rots, caused mostly by Clytocyte and some Armillaria, are reported as very bad in Arkansas, causing a loss of many acres of trees annually.

Gummosis, probably following freezing injury, reported on Golden Drop in Michigan.

Spray injury is reported from Connecticut. Complaints received from those who gave summer spraying with various sprays.

Frost injury is reported from Connecticut. Late frosts killed blossoms, especially in early varieties in certain orchards. Light bloom of Champion with consequent light crop. There will be a fair crop of Elberta if fruit does not drop too much. Winter injury to trees in 1917-18 has greatly reduced the number of bearing trees.

A loss of about 5000 peach trees in the lower Salt River Valley, due to water-logged condition of the soil, has just been reported. This is a very important matter in connection with irrigation. Its economic importance in a state where the orchard acreage is small is noteworthy.

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THE PLANT DISEASE BULLETIN

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THE PLANT DISEASE SURVEY

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BARLEY

Stripe caused by Helminthosporium gramineum.

Iowa: (Bakke and Cromwell.) General wherever barley is grown. One field observed with 25-35% stripe by actual count, and another field with from 10-15%.

Michigan: (Coons, July 1.) Stripe is more severe in seedling stage than ever before noticed. Whole fields reported severely injured.

Texas: (Summary of Cereal Disease Survey, May 13-30.) Found in seven out of twenty-one counties surveyed in amounts ranging from slight to considerable. Apparently most abundant in Wichita County.

Net blotch caused by Helminthosporium teres.

Iowa: (Bakke, July 1.) Common but damage so far slight.

Michigan: (Coons, July 1.) Exceptionally prevalent and killing whole leaf blades.

Texas: (Summary of Cereal Disease Survey, May 13-30.) One case found in the 21 fields of barley inspected.

Covered smut caused by Ustilago hordei.

Alabama: (Summary of Cereal Disease Survey, May 13-28.) Found in both of the two barley fields inspected. In one case a trace was present and in the other case 2%.

Iowa: (Bakke, July 1.) General wherever barley is grown.

Texas: (Summary of Cereal Disease Survey, May 13-30.) Found in 17 out of 21 fields inspected in amounts ranging from a trace to 60% (average 7.9%). Formaldehyde treatment in all cases successful.

Loose smut caused by Ustilago nuda.

Alabama: (Summary of Cereal Disease Survey, May 13-28.) A trace found in one field.

Texas: (Summary of Cereal Disease Survey, May 13-30.) Found in 8 out of the 21 fields inspected in amounts ranging from a trace to 65% (average 3.8%).

Spot blotch caused by Helminthosporium sativum.

Iowa: (Bakke, June 19.) Damage slight so far.

Texas: (Summary of Cereal Disease Survey, May 13-30.) Found in 11 out of 21 fields inspected. Damage varying from slight to severe.

Scab caused by Fusarium sp.

Iowa: (Bakke, June 28.) Doing considerable damage in northern part of state.

OATS

Smut caused by Ustilago avenae and U. levis.

Alabama: (Peltier, June 15.) Smut not so serious as last year, due in part to the control work carried on last fall.

(Summary of Cereal Disease Survey, May 13-28.) Loose smut was found in 88 fields out of the 113 inspected, in amounts ranging from a trace to 20% (average 1.6%). Found most frequently in Tuscaloosa County. 77% of the 35 fields sown with Fulghum and 79% of the 44 fields sown with Texas Rust Proof were infested. Of the 14 fields sown with seed treated with Formaldehyde 1-40 and Copper Sulphate, 2 fields of Fulghum and 7 of Texas Rust Proof were infested. 99 fields were untreated.

Covered smut was found in 61 out of the 113 fields inspected in amounts ranging from a trace to 42% (average .8%). Found most frequently and in largest amounts in Tuscaloosa County. 17% of the 35 fields sown to Fulghum oats, and 70% of those sown to Texas Red Rust Proof were infested. 14 of the 113 fields were treated, 13 with Formaldehyde 1-40 and one with Copper Sulphate. Of the 14 treated fields, seven cases of infection ranging from a trace to 4.2% occurred.

Arkansas: (Elliott, July 15.) 10% loss possibly. Some very bad, 20-30%.

Colorado: (Leach, July 15.) Usually present in small quantities to 5% where seed is not treated.

Delaware: (LeCato, June.) General, about 4% loss.

Georgia: (Summary of Cereal Disease Survey, May 14-27.) Loose smut found in 22 out of the 23 fields inspected in amounts ranging from a trace to 12% (average 3.2%). Found most frequently in Early County but in highest percent in Thomas and Carroll Counties. 92% of the 13 fields of Fulghum oats and 100% of the 3 fields of Texas Rust Proof oats were affected. Out of the 23 fields inspected, 12 were planted with seed treated with the dry formaldehyde treatment and 11 were untreated. In the untreated fields infection ranged from 2-12%; in treated fields from a trace to 1%.

Covered smut was found in 4 out of the 23 fields inspected, 2% in each case. Found most frequently in Thomas County.

Florida: (Stevens, June 15.) No reports of serious injury from smut. Prevalent to some extent in most fields.

Kansas: (Melchers, July 15.) Slightly less than usual. Probably due to seed treatment. Oat seed treatments have given satisfactory results. Farmers take to it.

Louisiana: (Edgerton, June 15.) About the same as usual. The infection has been very heavy in fields grown from oats shipped in from other states, especially Texas. The infection on oats grown from local seed has been comparatively light.

Mississippi: (Beal, June 15.) General over the state. Probably both species present, but no attempt made to distinguish between them.

Oregon: (Barsse, July 15.) U. avenae has been found again this year running as high as 7-8%. Few records are in. Probably general but not usually serious as seed treatment is practiced everywhere.

Tennessee: (Essary, July 15.) Very common on winter oats. Loss estimated 10-15%.

Texas: (Summary of Cereal Disease Survey, May 13-30.) Loose smut found in 138 out of the 177 fields inspected in amounts ranging from a trace to 30% (average 4.8%). Found in largest amounts in Hays County. 78% of the 142 fields sown to Texas Rust Proof and 71% of the 7 fields sown to Furguson oats were infected. 54% or 13 out of the 24 fields sown with grain treated with formaldehyde wet or dry were infected in amounts ranging from a trace to 20% and 75% or 115 out of the 150 fields untreated were infested ranging from a trace to 30%.

Covered smut found in 67 out of the 177 fields inspected in amounts ranging from a trace to 24% (average 1.3%). Found most frequently in Hopkins and Lamar Counties. 42% of the 142 fields of Texas Rust Proof and 28% of the 7 fields of Furguson oats were infected. 28% or 7 out of the 24 fields treated with formaldehyde wet or dry were infested in amounts ranging from a trace to 1% and 39% or 60 out of the 153 untreated fields were infested, ranging from a trace to 24%.

(Taubenhaus, June 15.) Probably both present; made no careful study of same. 10% loss.

West Virginia: (Giddings, July 15.) Quite prevalent in Hardy County and causing probably 10% injury. Also found to a less extent in Berkeley, Jefferson, Preston and Monongalia Counties.

Leaf rust caused by Puccinia coronata.

Alabama: (Peltier, June 15.) Very abundant this season, ranging from 5 and 10% to 100%. Oats maturing medium early seem to be best for rust escaping according to the experimental trial plots. On these plots late oats were affected worse, but some of the hybrids gave considerable promise.

(Summary of Cereal Disease Survey, May 13-28.) Found in 18 out of the 113 fields inspected, in amounts ranging from a trace to 40% (average 1.7%). 6% of the 35 fields sown to Fulghum and 23% of the 44 fields of Texas Rust Proof oats were infected.

Arkansas: (Elliott, July 15.) Serious, 5% loss.

Georgia: (Summary of Cereal Disease Survey, May 14-27.) Found in 22 out of the 23 fields inspected, in amounts ranging from 10-65% of the affected leaf area (average 23.6%). Found in all fields inspected in all counties except in one field of Texas Rust Proof in Carroll County.

Illinois: (Cromwell, May 30.) One-half acre of a late planted field in Antioch was so badly affected with rust that it will be almost a total loss. An old planting of Rhamnus cathartica was within a few rods and showed aecia.

Kansas: (Melchers, July 15.) Occurred somewhat late, but quite common over the state. No damage will result.

Louisiana: (Edgerton, June 15.) Infection about the same as usual. Some fields have shown considerable of this rust but the loss is probably small. Only rust-resistant oats are grown but these are far from being totally resistant.

Tennessee: (Essary, July 15.) Common. Heavy infection on winter and spring varieties.

Texas: (Summary of Cereal Disease Survey, May 13-30.) Found in 140 out of the 177 fields inspected in amounts ranging from 1/2 to 65% (average 11.3%). Found in all counties inspected, excepting Archer, Wise and

Gillespie. 84% of the 142 fields sown with Texas Rust Proof and 71% of the 7 fields sown with Furguson oats were infested.

Stem rust caused by Puccinia graminis.

Georgia: (Summary of Cereal Disease Survey, May 14-27.) Found in two out of the 23 fields inspected, in each case to the amount of 40%. Both infested fields were found in Early County.

Kansas: (Melchers, July 15.) Traces found in many fields.

Texas: (Summary of Cereal Disease Survey, May 13-30.) Found in 44 out of the 177 fields inspected in amounts ranging from a trace to 65% (average 1.8%). Found most frequently in Hays County but in largest amounts in Denton County. 29% of the 142 fields sown with Texas Rust Proof showed rust and no cases of infection were found in the 7 fields sown with Furguson oats.

Blast cause undetermined.

Alabama: (Summary of Cereal Disease Survey, May 13-28.) Found in 40 out of the 113 fields inspected, in amounts ranging from very slight to abundant. 28% of the 35 fields of Fulghum and 36% of the 44 fields sown with Texas Rust Proof Oats were infected.

Georgia: (Summary of Cereal Disease Survey, May 14-27.) Found in 6 out of the 23 fields inspected in amounts ranging from very slight to moderate.

Texas: (Summary of Cereal Disease Survey, May 13-30.) Found in 110 out of the 177 fields inspected in amounts ranging from a trace to very abundant. Found most frequently in Hays and Kendall Counties. 69% of the 142 fields of Texas Rust Proof and 57% of the Furguson oats were infected.

Blade blight caused by Bacteria.

Delaware: (LeCato, June.) Moderate, but probably reducing yield by about 6%.

New York: Common on Long Island.

Other diseases.

A disease or condition is affecting oats in Missouri so that many leaves turn yellow and purple, and later die.

Halo leaf spot caused by bacteria is general but not destructive in parts of Iowa.

Anthraxnose caused by Colletotrichum cereale was reported from 12 oat fields in Alabama as very slight or slight.

A bacterial blight of oats is reported from Texas by scouts of the Cereal Disease Survey. This was found in 32 fields out of 177 inspected, in amounts ranging from very slight to severe.

A blade blight, cause not given, is common throughout Alabama. Reports show the presence of from a trace to 10%.

Hot, dry weather from June 1 on, in Michigan, caused severe injury to oats. The blades turned yellow and red leaf followed on older leaves.

RYE

Anthraxnose caused by Colletotrichum cereale.

Alabama: (Summary of Cereal Disease Survey, May 13-28.) Found in 15 out of

the 18 fields inspected, in amounts ranging from very slight to 50%. 12 out of the 14 fields of Albruzzi rye were found infected.

Iowa: (Bakke, July 1.) Common throughout the state. Very severe at Danville, a probable reduction of 15% in the yield. First collected at Vinton, June 5.

Kentucky: (Miss Roe, July 15.) Reported as abundant in McCracken County, and 15% in Calloway County, causing a loss of 1%.

Ohio: (Detmers, July 15.) Infection severe in Mahoning County. No general observations made.

Virginia: (Fromme, July 1.) Severe in the southern section of the state and at least a trace throughout the state.

Ergot caused by Claviceps purpurea.

Georgia: (Berry, July 1.) A trace reported from southern Georgia; also a very slight case in Bibb County.

Illinois: (Anderson, July 15.) Ergot does not seem to be so abundant as last year but I have observed sixty percent infection in fields where volunteer rye has appeared in clover and wheat.

Iowa: (Bakke, July 1.) There is not nearly so much ergot as there was a year ago. First collected at Vinton June 5.

Ohio: (Detmers, July 15.) Rather severe in one field in Sandusky County. Noted occasionally over state.

Pennsylvania: (Orton, July 15.) Found in one field at State College, 2% of the heads infected.

West Virginia: (Giddings, July 15.) Specimens collected in Monongalia County and about 5% of heads infected in the field examined.

Wisconsin: (Vaughan, July 15.) More ergot than for several years. One field in Outagamie County showed 95% of the plants with one or several sclerotia to the head.

Leaf rust caused by Puccinia dispersa.

Alabama: (Summary of Cereal Disease Survey, May 13-28.) Found in 11 out of the 18 fields inspected, ranging from a trace to 65% (average 11.5%). 9 out of the 11 fields of Albruzzi rye were infected.

Colorado: (Leach, July 15.) A trace reported from Rocky Ford, June 10, and 3% on June 20. 5% reported from Holly on June 17.

Georgia: (Berry, July 1.) 25-75% infection over the state.

Illinois: (Anderson, July 15.) Leaf rust on rye is the worst I have ever seen it in this state. There was one hundred percent infection early in the season and a great many of the leaves were dead before the heads were filled out.

Iowa: (Bakke, July 1.) General throughout state. First reported from Rembrandt, June 4.

Kansas: (Melchers, July 15.) Quite common on foliage.

Kentucky: (Miss Roe, July 15.) 10% reported from Callaway County and 25% from Daviess County.

Pennsylvania: (Orton, July 15.) Prevalent in most places, not severe.

Tennessee: (Essary, July 1.) Very common, Heavy infection, causing a light yield.

Texas: (Summary of Cereal Disease Survey, May 13-30.) Found in 2 out of the 3 fields inspected, 10% and 35%.

Virginia: (Fromme, July 1.) Rather common, damage uncertain.

Wisconsin: (Vaughan, July 15.) Very little noted thus far.

Stem rust caused by Puccinia graminis.

Georgia: (Summary of Cereal Disease Survey, May 15-21.) Found, out of the three fields inspected, a case of 10% in Mitchell County.

(Berry, July 1.) But a trace reported from south Georgia.

Illinois: (Anderson, July 15.) Very little stem rust has appeared on the rye in central Illinois, due probably to the early ripening of the crop.

Kansas: (Melchers, July 15.) Observed only in traces.

Pennsylvania: (Orton, July 15.) Found most prevalent in Lancaster and Franklin Counties. Infection in most cases not severe.

Texas: (Summary of Cereal Disease Survey, May 15-22.) One case of infection, 24%, found in Wichita County. Three fields inspected.

West Virginia: (Giddings, July 15.) Observed on rye in Hardy County. Not destructive and rye not an important crop.

Wisconsin: (Vaughan, July 15.) Small amount noted at Madison. No report from outside.

Other diseases.

Scab, caused by Fusarium, is reported as common in Iowa. Where rye is heavy there is a large amount of scab. First observed at Danville, June 13.

Septoria, caused by Septoria secalina, is reported from Texas as very slight in one of the three fields inspected.

Broken stem, caused by Mycosphaerella sp., is reported as most severe in Sandusky County, Ohio. Yield reduced about 3% by failure of development of heads.

WHEAT

Scab caused by Fusarium spp.

Alabama: (Summary of Cereal Disease Survey, May 13-28.) Found in 13 out of the 133 fields inspected, in amounts ranging from very slight to 5%.

(Peltier, July 1.) A trace of scab was found on the station farm.

No reports of scab were received from the south half of the state.

Scattering reports have been received from the north half of the state.

Increasing in severity in Lauderdale County.

Arkansas: (Elliott, July 1.) Very little, no damage.

Colorado: (Leach, July 15.) None observed or reported to date. The season has been unusually dry.

Delaware: (LeCato, June.) Local and causing slight damage, 1% reduction in yield.

Georgia: (Berry, July 1.) Quite common this season, especially when wheat follows corn in rotation. From a trace to 2% all over the state.

(Summary of Cereal Disease Survey, May 15-21.) Found in 23 out of the 39 fields inspected, in amounts ranging from a trace to 10% (average .8%). 72% of the 25 fields of Mediterranean Blue Stem and 44% of the 9 fields of May wheat were infested.

Illinois: (Anderson, July 15.) County agents report wheat scab as unusually severe. I have made few observations myself, but where seen, the scab has appeared about the same as last year. I believe the county agents are getting more familiar with it, and for this reason they note its abundance.

Indiana: (Gardner, July 15.) Most serious wheat disease in Indiana, and has been reported from all parts of the state. Infection varied from 0-100%, and the yield was greatly reduced in many cases.

- Iowa: (Bakke, July 15.) Very common throughout the state. Most destructive disease of wheat in state. First observed at Muscatine June 16.
- Kansas: (Melchers, July 15.) Occurred in small amounts in many fields. No damage.
- Kentucky: (Miss Row, July 1.) Disease has been generally reported from all over the state in amounts varying from a trace to as high as 60% affected heads.
- Ohio: (Selby, July 15.) Generally severe especially in western and northern Ohio and where wheat followed corn, maximum percent of head attack 80%, low percentages in southeast. Estimated maximum loss in yield scarcely exceeds 33%.
- Pennsylvania: (Orton, July 15.) Franklin County reports scab prevalent in fields where wheat follows corn. Also known to exist in Adams and Centre Counties. The loss will average about 3% I think.
- South Dakota: (Champlin, July 5.) Reported developing to an alarming extent in the vicinity of Lake Andes, particularly on Marquis wheat.
- Tennessee: (Essary, July 1.) Heaviest infection known. Serious damage. Loss estimated 10-90%.
- Texas: (Taubenhaus, July 1.) Prevalent, 2% loss.
- Virginia: (Fromme, July 1.) Again severe in mountain section of southwest, also reported as considerable from valley (Rockingham County) and from Fauquier County. Very little in southern and eastern sections. One field with 50% infected heads examined in Pulaski County, corn had preceded.
- West Virginia: (Giddings, July 1.) This is, I believe, the most serious disease of wheat in West Virginia. Last year it was very prevalent and the wheat was refused at some mills on account of the scab infected grain. This year it is quite generally reported and is likely to be as destructive as it was last year.
- (Berg, July 14.) Severe in some of the low-lying fields on the Ohio River bottom lands in Pleasant County, as high as 85% of the heads were affected. More or less abundant in nine other counties.
- Wisconsin: (Vaughan, July 15.) Marquis wheat in Rock County showed 95% of the plants infected. Some of the fields almost entirely gone. Reported from five other counties.

Bunt caused by Tilletia laevis and T. tritici.

- Alabama: (Summary of Cereal Disease Survey, May 12-28.) Found in 33 out of the 133 fields inspected, in amounts ranging from a trace to 20% (average .7%). 21% out of the 93 fields of Mediterranean Blue Stem and 33 1/3% of the 9 fields of Fulcaster were infested. Out of the 133 fields inspected 36 were sown to seed which had been treated with formaldehyde, 1-40, and 32 with seed which had been treated with Copper Sulphate. Four cases of bunt ranging from a trace to 2% were found in the 36 fields treated with formaldehyde, 1-40, and one field containing a trace was found in the 32 fields treated with Copper Sulphate.
- Arkansas: (Elliott, July 1.) Much less severe than last year. Formaldehyde treatment becoming general on account of campaign. About 2% of the total crop a loss.
- Delaware: (LeCato, June.) Moderate and general, caused a reduction in yield for state of about 3%.
- Georgia: (Berry, July 1.) From a trace to as high as 60% all over the state. Treated seed nearly free. Untreated, apparently healthy seed, resulted in as high as 60% loss.
- (Summary of Cereal Disease Survey, May 15-21.) Found in 10 fields out of the 39 inspected. Fields showed amounts ranging from a trace to

60% (average 2%). 20% of the 25 fields of Mediterranean Blue Stem and 33 1/3% of the 9 fields of May wheat were affected. Out of the 39 fields, the seed used in 6 of them was treated with Copper Sulphate, 16 with formaldehyde, 1-40, 2 with hot water, and 15 was untreated. 8 cases of infection were found in the untreated fields and 2 cases, one a trace and one 1/2%, in a field sown with grain treated with formaldehyde, 1-40.

Indiana: (Gardner, July 15.) General in the state, altho the majority of farmers had treated their seed. From present indications it seems that many farmers will be docked for smutty grain this year.

Kentucky: (Miss Roe, July 1.) A trace to 1 or 2% reported from five counties 1-15% in Logan County, 40% in McCracken County, 5% in Simpson County, and considerable in Union.

Oregon: (Barss, July 15.) Occurrence is general and as high as 7% has been found in some fields. Only Tilletia tritici has thus far been collected east of the Cascade Mountains.

Texas: (Summary of Cereal Disease Survey, May 13-June 2.) Found in 5 out of the 199 fields inspected, in amounts ranging from a trace to 2% (average .02%).

Loose smut caused by Ustilago tritici.

Alabama: (Summary of Cereal Disease Survey, May 12-28.) Found in 84 out of the 133 fields inspected, in amounts ranging from a trace to 10%. Found most frequently in Morgan County. 61% of the 93 fields of Mediterranean Blue Stem and 55% of the 9 fields of Fulcaster wheat were affected. No hot water treatments were made on the grain sown in these fields.

Arkansas: (Elliott, July 1.) Common. About 2 or 3% of total crop a loss.

Colorado: (Leach, July 15.) Very prevalent in small percentages, usually a trace to 2 or 3%. Seldom over 3 to 5%.

Delaware: (LeCato, June.) General and moderate, 3% reduction in yield for state.

Georgia: (Berry, July 1.) Occurs all over state. Loss varies from a trace to as high as 8 or 10%. Usual range is between 2 and 6%.

(Summary of Cereal Disease Survey, May 15-21.) Found in 26 fields out of the 39 inspected. Plants were affected in amounts ranging from a trace to 4% (average .8%). 68% of the 25 fields of Blue Stem and 55% of the 9 fields of May wheat were affected. Of the 2 fields out of the 39 which were treated with hot water, one had no infection and the other 1/2%.

Indiana: (Gardner, August 1.) Was widely distributed throughout the state as usual; in some cases as high as 50-70% infections were reported. Treated seed was quite free from smut, and very much interest has been aroused in hot water seed treatment.

Iowa: (Bakke, July 15.) Common throughout the state. More in the southern part of the state. First observed June 7, at Fairfield.

Oregon: (Barss, July 15.) Not general but found locally.

Texas: (Summary of Cereal Disease Survey, May 13-June 2.) Found in 138 out of the 199 fields inspected in amounts ranging from a trace to 20% (average 1.3%). 66% of the 110 fields sown with Mediterranean Blue Stem, and 66% of the 9 fields sown with Turkey Red wheat were infected. No hot water treatment.

Stem rust caused by Puccinia graminis.

Alabama: (Peltier, July 1.) Only scattering specimens of stem rust have been gathered by Dr. Ludwig in Alabama this spring.

(Summary of Cereal Disease Survey, May 12-28.) Found in 5 out of the 133 fields inspected in amounts ranging from a trace to 40% affected

leaf area (average .6%). Highest percentage found in Escambia County.

Arkansas: (Elliott, July 1.) Very little, no damage done.

Colorado: (Leach, July 15.) The disease was reported from Burlington, June 28, ranging from 1 to 2 1/2%.

Georgia: (Summary of Cereal Disease Survey, May 15-21.) Found in 16 out of the 39 fields inspected. Plants were affected in amounts ranging from 1/2 to 100% (average 16.2%). The disease was found most frequently in Mitchell County. 14% of the 25 fields of Mediterranean Blue Stem and 2% of the 9 fields of May wheat were affected.

(Berry, July 1.) 5% to 95% infection in south Georgia, but a trace in north Georgia. Last year but a trace of stem rust found in the state.

Illinois: (Anderson, July 15.) Stem rust appeared about Urbana as early as June 25, on winter wheat. There is a decided variation in the amount of stem rust, from 5 to 50%. It will probably do no damage to the winter wheat on account of the early harvest.

Kansas: (Melchers, July 15.) Occurred in all parts of the state. Some fields in southern Kansas had 50% stem rust. Many fields showed from a trace to 15% and some fields 35%. A combination of climatic conditions and stem rust will cause some shrivelling of wheat in southern Kansas.

Kentucky: (Miss Roe, July 1.) Reported from nine counties in amounts varying from a trace to 10%.

Ohio: (Van Pelt, July 15.) Reported as general near Wilmington, Dayton and Wooster, but causing only slight injury.

Oregon: (Hoerner, July 15.) Practically none in grain fields throughout state. A small amount on some varieties on College Farm at Corvallis.

Pennsylvania: (Orton, July 15.) Most prevalent in Lancaster and Franklin Counties. Some 150 A. in Lancaster County showed 40 to 85% infection and some 300 A. in Franklin County showed 40 to 100%. Considerable infection was also found in Lackawanna and Susquehanna Counties, local infection was found in four other counties. Aecial stage was observed on barberry in several counties. Barberry escaped cultivation in a number of places.

South Dakota: (Champlin, July 5.) Very slight amount locally. Observed on Turkey winter wheat.

Tennessee: (Essary, July 1.) Scattered infection in all sections coming late in season. Serious in a few localities.

Texas: (Summary of Cereal Disease Survey, May 13-June 2.) Found in 137 out of the 199 fields inspected, in amounts ranging from a trace to 85%. Found in largest amounts in Wichita County. 72% of the 110 fields of Mediterranean Blue Stem and 89% of the fields of Turkey Red wheat were affected.

Virginia: (Fromme, July 1.) No serious injury. Present to a slight extent but coming too late to damage. Heaviest infection found in Pulaski County.

West Virginia: (Giddings, July 1.) This disease has been found more prevalent than usual in the entire southern and central portions of the state. Mr. Christopher of the Office of Cereal Investigations is securing much interesting data from southwestern Virginia in regard to the stem rust and its relation to the barberry.

(Berg, July 14.) Very severe especially on later varieties of wheat in Upshur County, and also severe in Hardy and Cabell Counties.

Wisconsin: (Vaughan, July 15.) Very bad near Madison on winter wheat, coming rapidly on spring wheat.

Leaf rust caused by *Puccinia triticina*.

Alabama: (Peltier, July 1.) Has been more severe this season than the past three or four years. The percentage of infection ranging from 10 to 100%. On the station farm, it has ranged from 25-100% on various varieties.

(Summary of Cereal Disease Survey, May 12-28.) Found in 116 out of the 133 fields inspected, ranging from a trace to 100%. Found in all the counties but in least amounts in Macon and Talledega Counties. Both Fulcaster and Mediterranean Blue Stem are very susceptible.

Arkansas: (Elliott, July 1.) Very severe. In many localities wheat did not mature on account of the injury. 10% of the total crop lost.

Colorado: (Leach, July 15.) First reported May 30 from Fort Collins where a trace was observed. Since that date twelve other reports have been received. Amounts varied from a trace to 65% affected leaf areas.

Delaware: (LeCato, June.) General and severe, 20% reduction in yield for the state.

Georgia: (Summary of Cereal Disease Survey, May 15-21.) Found in 37 out of the 39 fields inspected. Plants were affected in amounts ranging from 10 to 100% (average 54.6%). 90% of the 25 fields of Blue Stem and 100% of the 9 fields of May wheat were infected.

(Berry, July 1.) Very common and quite destructive this season. 50% to 100% infection over the entire state.

Illinois: (Anderson, July 15.) Leaf rust of wheat was unusually bad this year. 100% of the leaves were infected and a great many leaves died early in the season. It is impossible to estimate the loss from this disease.

Indiana: (Gardner, August 1.) Quite generally distributed throughout the state. In most of the northern sections of the state the surface of the leaves at harvest were brown with rust. In the northern section of the state especially wheat on low land was most seriously affected.

Iowa: (Bakke, July 1.) General. Red Cross wheat very susceptible. In some cases as high as 90%.

Kansas: (Melchers, July 15.) Very prevalent, the worst it has been in a number of years. Seriously attacking the culms and peduncles of wheat plants. Kanred grown all over Kansas showed marked resistance. The percentage of infection for the state for Kanred on the foliage averaged about 10% and practically no culm infection.

Mississippi: (Beal, July 1.) General where wheat is grown this season. Several fields in southern Mississippi observed where leaf infection was 100%.

Missouri: (Maneval, June 2.) Leaf rust has developed to an alarming extent in Jackson and Lafayette Counties according to my own observations on this trip. It has also been reported from a number of different sources so that I am inclined to think that injury due to it will be unusually severe this season. The wheat is very tall and much of it is beginning to lodge badly.

Ohio: (Selby, July 15.) General although not severe.

Oregon: (Owens, July 15.) Very moderate infection of leaf rust is reported throughout territory west of Cascade Mountains. No apparent damage to date.

Pennsylvania: (Orton, July 15.) Prevalent in most counties, not severe except in certain localities.

South Dakota: (Champlin, July 1.) General and moderate, 5% reduction in yield estimated.

Tennessee: (Essary, July 1.) Heavy infection general over the state.

Texas: (Summary of Cereal Disease Survey, May 13-June 2.) Found in 183 out of the 199 affected fields, in amounts ranging from 1-100% (average 29.5%). Found in all the counties inspected excepting Hunt County. 91%

of the 110 fields of Mediterranean Blue Stem and 100% of the 9 fields of Turkey Red wheat were infected with rust.

Virginia: (Fromme, July 1.) 19 farmers attribute general failure of wheat in eastern and middle sections to leaf rust. Much of the wheat there will fall short of expectations from 30-50%. Just how much of this can be assigned to leaf rust is questionable, but I am inclined to think that it has been an important factor.

Wisconsin: (Vaughan, July 15.) Generally prevalent in wheat fields about Madison. Both winter and spring varieties affected.

West Virginia: (Giddings, July 1.) Quite prevalent. I believe that this disease causes appreciable injury to the wheat crop in West Virginia.

Anthracnose caused by Colletotrichum cereale.

Alabama: (Peltier, July 1.) More or less general. Little or no damage this season.

(Summary of Cereal Disease Survey, May 12-28.) Found in 56 out of the 133 fields inspected, in amounts ranging from very slight to 3%. Found in all fields inspected in Calhoun and Marshall Counties. 44% of the fields sown to Mediterranean Blue Stem and 78% of the fields sown to Fulcaster were affected.

Delaware: (LeCato, June.) General and causing moderate damage.

Iowa: (Bakke, July 15.) Common, but is believed not to be doing serious damage. First reported from Donaldson, June 16.

Kentucky: (Miss Roe, July 1.) Reported in slight amounts from Anderson, Fayette, Livingston, Logan, Simpson and Trigg Counties; 4-5% from Calloway and Fulton; 18% from Union and abundant in Hickman.

Ohio: (Detmers, July 15.) Present in Experiment Station plots in moderate amounts. Not advised as to general occurrence in state.

Texas: (Summary of Cereal Disease Survey, May 13-June 2.) Found in 35 out of the 199 fields inspected, in amounts ranging from very slight to very abundant. Found most abundantly in Lampasas County. 22% of the 110 fields of Mediterranean Blue Stem were affected and none of the 9 fields of Turkey Red Wheat.

Glume spot and leaf spot caused by Septoria glumarum and S. graminis.

Alabama: (Peltier, July 1.) General throughout the state. Ranging in severity from very slight to bad.

(Summary of Cereal Disease Survey, May 12-28.) Found in 95 out of the 133 fields, in amounts ranging from very slight to 40%. Found most frequently and in greatest amounts in Chilton and Walker Counties. 76% of the 93 fields sown to Mediterranean Blue Stem and 44% of those sown to Fulcaster were affected.

Georgia: (Summary of Cereal Disease Survey, May 15-21.) Found in 8 fields out of the 39 inspected, ranging in amounts from very slight to very abundant. Found most frequently in Carroll County. 2% of the 25 fields of Blue Stem and 2% of the 9 fields of May wheat were affected.

Indiana: (Gardner, August 1.) Septoria leaf spot was widely distributed throughout the state, almost no fields being free from it. In few cases however did it seriously reduce the yield.

Septoria of the glumes was observed in many fields at harvest time. It was associated with septoria leaf spot.

Iowa: (Bakke, July 1.) Found to a high percentage on winter wheat at Agronomy farm.

Very common early in the spring. By this time it has worked up the stems to the upper leaves. Trace on glumes.

Kansas: (Melchers, July 15.) On the glumes caused injury in some fields. Low spots and lodged wheat had worst infection. Although not as widely spread and black chaff, the injury was just as severe in many fields.

Kentucky: (Miss Roe, July 1.) Reported as more or less abundant but with little damage in fourteen counties. One case of 95% in Logan County.

Ohio: (Selby) Glume spot, caused by Septoria spp., is rather prevalent at the Station in Ohio. No serious damage. Appears to be quite general over the state.

Leaf spot, caused by Septoria spp., is reported as general and moderately severe during the late spring over the southwestern and central portions of Ohio. Also noticed at the Experiment Station.

Pennsylvania: (Orton, July 15.) Generally prevalent and in some cases quite severe and associated with poor yields, but cause not certain.

Texas: (Summary of Cereal Disease Survey, May 13-June 2.) Found in 48 out of the 199 fields inspected in amounts ranging from very slight to abundant. Found most frequently in Cooke, Collin, Coryell and Grayson Counties. 22% of the Mediterranean Blue Stem fields were affected and none of the Turkey Red.

Virginia: (Fromme, July 1.) Farmers were considerably alarmed by the unusual development of Septoria on heads. There were traces of this all over the state, but greatest development occurred in the belt marked by Greensville, Henrico and Caroline Counties. Losses ascribed to this probably accounted for by leaf rust, anthracnose, joint worm and hessian fly.

West Virginia: (Giddings, July 1.) Quite a little Septoria infection has been observed in many fields.

Black chaff caused by Bacterium sp.

Arkansas: (Elliott, July 1.) Present in most fields. No evidence of injury.

Colorado: (Leach, July 15.) Reported as very slight from Holly and considerable from Rocky Ford.

Iowa: (Bakke, July 1.) Common on winter wheat. First observed in Kossuth, June 14.

Kansas: (Melchers, July 15.) Common in most fields. Present in only traces in many fields. Low spots had often times quite serious infection. Not as common or serious as in 1915.

Texas: (Summary of Cereal Disease Survey, May 13-June 2.) Found in 5 out of the 199 fields inspected in amounts ranging from slight to abundant.

Wisconsin: (Vaughan, July 15.) Prevalent on station plots of Kansas grown wheat. No reports from outside.

Other diseases.

Nematode injury, caused by Tylenchus tritici, is reported as present in Jackson County, north Georgia where it is limited to an area of 100 square miles. Infection runs from 1-100%. But one field which is a total loss.

Mildew, caused by Erysiphe graminis, is reported from West Virginia as unusually prevalent, and having caused some little injury in many wheat fields this year.

Ergot, caused by Claviceps purpurea, is reported from one field in Rock County, Wisconsin. 2% infection.

Stripe rust, caused by Puccinia glumarum, is reported by Owens July 15 as abundant on grasses, especially Elymus, throughout territory west of Cascades in Oregon. Has been reported as far east as Union County. Occurs on susceptible varieties of wheat such as Little Club, Jones Winter Fife, and

slightly on Turkey. Absence of rust on wheat growing in close proximity to infested grasses in some localities due to fact that wheat happens to be resistant variety. Very severe outbreak on susceptible varieties on Experiment Station grounds.

Freezing injury did a great deal of damage to Indiana wheat early in the spring. Much of this wheat did not recover and there was quite a reduction in yield.

Take-all (cause not definitely determined.)

American plant pathologists are already fairly well acquainted with the situation existing in the United States regarding take-all of wheat. The following account is given however in order that the subject may be recorded in the Plant Disease Bulletin.

About the middle of April 1919 a destructive wheat disease was noticed by the county agent of Madison County, Illinois and reported by him to the Illinois Agricultural Experiment Station, and also to the United States Department of Agriculture. After a conference with the Illinois authorities, an examination of the affected fields was made April 21 by A. G. Johnson of the Office of Cereal Disease Investigations. The examination showed the disease to be very similar to, if not identical with, the take-all that has been known for many years in Australia and Europe. Whether or not it was the same as the disease in these countries of course could not be determined definitely at that time, and even at the present writing the matter has not yet been fully settled.

Immediately steps were taken to begin a study of the cause of the disease and Mr. H. H. McKinney of the Office of Cereal Disease Investigations was assigned to the work, with headquarters at St. Louis, Missouri. At the same time arrangements were made to bring together in conference as large a number of pathologists as possible in order to acquaint them with take-all by personal inspection of the Illinois fields. A number of men engaged in the cereal disease survey of the Department of Agriculture were called together at St. Louis on May 5. Immediately on entering the fields the Australian flag smut, caused by Urocystis tritici, was discovered by Mr. Dixon. This smut was not developed sufficiently to be seen at the time of the first inspection of these fields. The finding of flag smut added great weight to the belief that the take-all disease was the same as that occurring in Australia, as both flag smut and take-all are very prevalent in Australia and the smut is only known in that section of the world. Although, of course, it will be necessary to discover a common causal organism before it can be proven that the two take-all diseases are identical, still the finding of flag smut in the same fields with take-all is very good circumstantial evidence that the take-all in the United States is similar to that of Australia.

After inspecting the affected fields in Madison County the cereal disease survey men separated and went to various states to make a survey for cereal diseases, with particular reference to smuts. This survey extended all over the eastern half of the United States, and during the course of the season the men inspected a great many fields in widely separated and representative parts of the country. In all their survey work they were on the constant look-out for the newly discovered take-all and flag smut.

On May 12 a still larger group of plant pathologists and agronomists were assembled at St. Louis to get first hand knowledge of these diseases. Representatives were present from the following states; New York, Pennsylvania, Virginia, Kentucky, South Carolina, Georgia, Alabama, Arkansas, Oklahoma, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, North

Dakota, South Dakota and Kansas. Pathologists from Iowa, Nebraska, Maryland, West Virginia and Delaware also had the opportunity to view the affected fields in Illinois at about the same time. The report of this meeting has been made available in mimeographed form. On their return to their respective states these men at once instituted a search for the disease. In addition to this in many states considerable publicity was given to the troubles, newspaper articles were written and circular letters, etc. were sent around to county agents and other persons. In Illinois and Indiana meetings of county agents were held to view the affected fields. As a result of this publicity work and travel a great many suspected reports were received in the various states, but on being followed proved to be something other than take-all or flag smut.

Geographical Distribution.

During the entire season the disease has been found only in the two states of Indiana and Illinois. Its present known geographical distribution is as follows: Illinois - Mason County, Madison County, Sangamon County; Indiana - Porter County, Laporte County and Tippecanoe County. The Indiana occurrences were reported early, immediately after the discovery in Madison County. It seems that farmers in the two northern Indiana counties discovered that something was the matter with their wheat and reported it to the County Agent. At about that time the county agents received word from the Agricultural Experiment Station of the discovery of the new take-all disease and at once informed the Station of the situation in their counties. An examination of the fields showed it to be the same disease that occurred in Madison County. Because of the publicity that has been given take-all and because of the wide search that has been made for it, it is probable that the disease is still quite limited in its range. It is believed at least that the more important areas have already been located.

The following summary shows the number and acreage of affected fields in Indiana and Illinois and also the percentage of take-all in the fields.

Table 10. Summary of the occurrence of take-all of wheat in the United States, 1919.

COUNTY	NO. OF FIELDS INFESTED	ACREAGE OF INFESTED FIELDS	% OF TAKE-ALL IN INFESTED FIELDS		
			MINIMUM	MAXIMUM	AVERAGE
ILLINOIS					
Madison	29	629	One plant: in 20 A.	85	5-10
Mason	48	1310.5	t	70	9.2
Sangamon	2	380	t	5	2.5
INDIANA					
Porter	6	120	t	65	10
Laporte	5	150	t	t	t
Tippecanoe	1	5			t

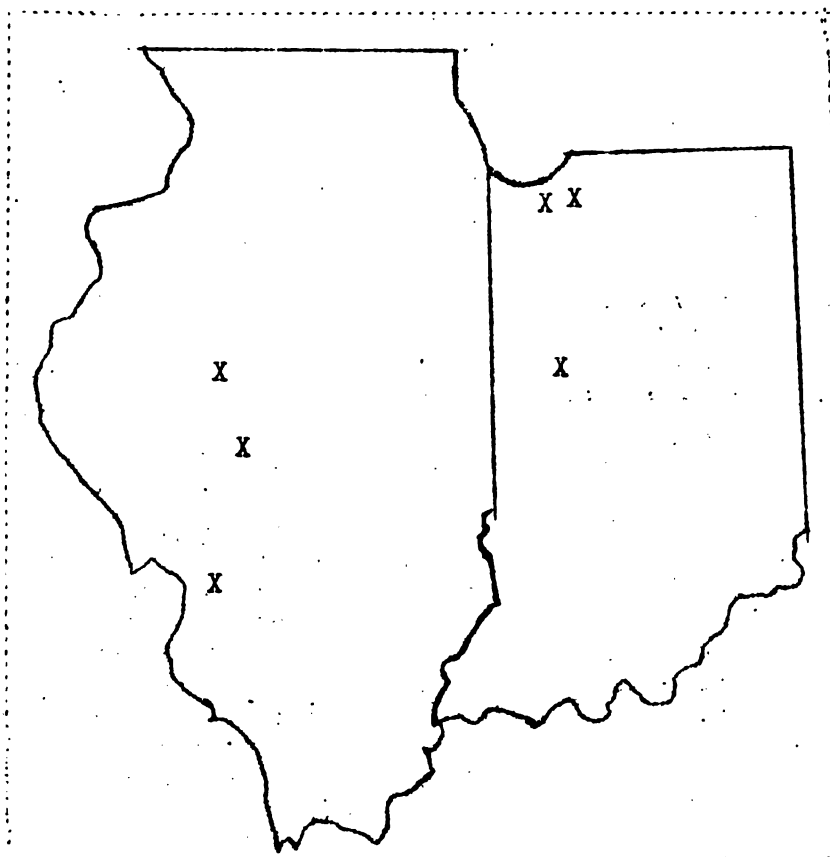


Fig. 1. Map of Illinois and Indiana showing the approximate location of the six counties where take-all of wheat has been found.

Symptoms.

The symptoms of take-all in the United States vary in different fields. In some fields distinct patches of dwarfed, sickly, or dead plants occur. These patches vary greatly in outline and size, from a few feet across to several acres in extent. In other fields the entire area is involved, so that patches are not evident. Badly affected plants are much dwarfed and remain in the rosette stage instead of shooting up and forming heads. When such plants are pulled, they often break near the crown, leaving the roots in the ground. An examination shows that the crown and base of the stalks are badly rotted.

The leaves of plants affected with take-all are usually of a bluish-green color in marked contrast with the normally green leaves of healthy plants. This difference in leaf color is very characteristic and is helpful in recognizing the disease. Affected plants, in an attempt to recover, often send up new shoots which are weak and slender and remain short. In Europe and Australia take-all is distinguished in its later stages by what is termed "white-heads". That is, some of the plants are not affected badly enough to be dwarfed or killed in the early or seedling stage. Such plants may head out, but the head produces no grain and soon becomes white and dead.

Exclusion and Eradication Measures.

Already the Federal Horticultural Board has placed a quarantine on the importation into the United States of rice, wheat, oats, barley and rye from Australia, India, Japan, Italy, France, Germany, Belgium, Great Britain, Ire-

land and Brazil. This quarantine is to be effective August 15, 1919. This action will tend to prevent the introduction of any more of the two diseases. The problem then is one of control of the areas where the disease now occurs. This is being taken care of by the Indiana and Illinois state departments of agriculture cooperating with the Federal Department of Agriculture.

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UNITED STATES DEPARTMENT OF AGRICULTURE

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BARLEY

Stripe caused by Helminthosporium gramineum.

- Idaho: (Hungerford, July 27.) Noted in a number of different places in the state. Only a trace in many fields examined.
South Dakota: (Champlin, August 1.) 1% or less.
Wisconsin: (Vaughan, August 1.) Few fields have more than trace, very markedly less than last year. Probably a result of unfavorable climatic conditions as the two hour treatment was not general.

Stem rust caused by Puccinia graminis.

- Idaho: (Hungerford, July 27.) Reported from one locality and not serious there.
Iowa: (Melhus, August 1.) About 25% affected area.
South Dakota: (Champlin, August 1.) 10-15%.
Wisconsin: (Vaughan, August 1.) More than usual but not so serious as on other grains.

Loose smut caused by Ustilago nuda.

- Idaho: (Hungerford, July 27.) Very little noted this year.
Iowa: (Melhus, August 1.) 1% as average for the state.
South Dakota: (Champlin, August 1.) 2% as average for the state.
Wisconsin: (Vaughan, August 1.) Loss slight, Less than usual.

Covered smut caused by Ustilago hordei.

- Idaho: (Hungerford, July 27.) Very little.
Iowa: (Melhus, August 1.) 1% for the state.
South Dakota: (Champlin, August 1.) 1% or less.
Wisconsin: (Vaughan, August 1.) Loss slight. Less than usual.

Other diseases.

Scab, caused by Fusarium spp., was reported as causing 5% infection of barley in Iowa August 1, and 2-3% infection in South Dakota on that date.

Ergot, caused by Claviceps purpurea, has been reported from Grant and Dane Counties, Wisconsin.

OATS

Smut caused by Ustilago avenae and U. levis.

Virginia: (Fromme, July 15.) Both smuts prevalent about as usual. Will average 3-4% for the state. Oats are not an important crop. They are out for hay in some sections.

(Results of Cereal Disease Survey, June 4 - June 12.) Covered smut was found in two out of five fields inspected, a trace being present in each case. None of the farmers treated their seed.

Loose smut was found in four out of five fields inspected in amounts ranging from a trace to 35%.

Washington: (Heald, July 15.) Covered smut present in eastern Washington this year and several cases of loose smut noted in western Washington.

Other diseases.

Tip burn, attributed to hot, dry weather, is reported by Gardner from Indiana, August 1. Many complaints are being received in that state concerning a brown, discoloration at the tips of the leaves.

Leaf spot, caused by Helminthosporium sp., is reported by Gardner as quite general throughout the state of Indiana, although of small economic importance. Helminthosporium avenae is also reported from Clark and Snohomish Counties, Washington.

Frost injury is reported by Heald from Washington, July 15. It is characterized by a general reddening of the leaves and stunted or poorly filled panicles.

Red leaf, caused by Bacterid, is reported by C. R. Orton, June 21, from Pennsylvania. It is extremely prevalent all over the state but does not appear to be harming the oats much up to June 21. It was very conspicuous. Some of the reddening may be due to aphids also.

Anthraxnose, caused by Colletotrichum cereale, was found by field men of the Cereal Disease Survey in Virginia in two out of five fields inspected. In one case it was slight and in the other case abundant.

Stem rust, caused by Puccinia graminis, was found in Virginia in one out of five fields inspected in the Cereal Disease Survey.

Blast, non-parasitic, was found in Virginia in four out of five fields inspected in amounts ranging from slight to moderate.

Leaf rust, caused by Puccinia coronata, was found in Virginia in three out of five fields inspected in amounts ranging from 3-5% affected leaf area.

POTATO

Late Blight caused by *Phytophthora infestans*.

Alabama: (Peltier, June 1.) No reports or observations this spring.

Connecticut: (Clinton, July 25.) Has not been found in the state as yet.

Georgia: (McClintock, August 1.) None observed on late harvest of spring crop.

Second crop not up yet as it is being retarded by rain.

(Berry, June 1.) A few reports from sections of early Irish potatoes. No marked damage to vines until digging time. In a few cases about Savannah it resulted in a wet rot of the tubers. Weather wet at digging time.

Iowa: (Melhus, August 1.) No late blight as yet.

Louisiana: (Edgerton, August 1.) Have seen none this season.

Massachusetts: (Osman, August 1.) First observed July 24 in Berkshire County.

Infections slight.

New Jersey: (Cook, August 2.) So far as I know we have not had this disease in the state this season. A few suspicious specimens were found but a laboratory examination proved the trouble to be due to other causes. Many fields examined.

North Carolina: (Dr. Jehle, August 1.) "In Avery County there is also an epidemic of late blight on Irish potatoes. The vines have all been killed prematurely and I failed to see a single plant free from the disease. The county agent estimates that there will be a loss of about 75% of the crop, due to the disease. Spraying of Irish potatoes is not practiced in the county."

South Dakota: (Champlin, August 1.) None in evidence here.

Virginia: (Fromme, August 1.) First appeared July 1 at Blacksburg. Most potatoes were practically mature at this time and little damage resulted except on late plantings. The disease was general over Montgomery County. It appeared earlier than usual and the damage is more than for some years. Tomatoes here will generally be almost a total loss from late blight.

West Virginia: (Giddings, July 25.) "Specimens of blight have just been received from Randolph County, and a record of it is at hand from Tucker County. The disease is evidently well advanced and I fear the loss will be extremely heavy in these counties."

Wisconsin: (Vaughan, August 1.) Found at Rice Lake, Barron County, July 26, by J. W. Brann, while on a summer inspection trip for seed certification. The area involved is about 1/2 acre and is in a low place in the field. The fungus was found fruiting on the lower leaves but not on the stems. Heavy rains have been experienced recently. Growers in the vicinity of Rice Lake have been warned of the presence of the disease and will equip for spraying.

Early blight caused by Macrosporium solani.

Alabama: (Peltier, June 1.) A few cases observed in the Gulf Coast section. Not serious.

Connecticut: (Clinton, August 1.) Present, but no damage observed.

Georgia: (Berry, June 1.) Reports for Savannah district. Attack not severe until about digging time.

(McClintock, August 1.) 25% of the plants seriously injured. In some fields spraying did not appear to hold the fungus in check as the sprayed fields developed blight about the same as those receiving no spray.

Indiana: (Gardner, August 1.) Observed in several parts of the state, but severity was limited.

Kansas: (Blachly, June 25.) "Early blight has been doing considerable amount of damage in the Kaw Valley, Kansas. Estimates of damage have been made in various towns in the Valley as follows: 35%, 35%, 35%, 35%, 20%, 25%, 25%. A few growers sprayed their late planted potatoes and I believe received considerable benefit thereby. The Cobblers are not affected very much by early blight. In fact I do not believe there will be over 10% damage to the Cobbler crop. Dry weather is setting in now and I think it will aid the late planted potatoes. A great many of the early planted fields have completely lost their foliage and the rest of them will drop their leaves within the next few days. This seems to be the worst epidemic of early blight that has been experienced in the Valley. In fact only a few growers have had any experience with it before."

Louisiana: (Edgerton, August 1.) More or less common in all fields, but not severe enough to cause any loss.

Maryland: (A. C. Martin, June 28.) Infection general in Worcester County, but not severe.

Massachusetts: (Osman, August 1.) Unimportant the present season.

Mississippi: (Beal, June 1.) Very general this season. From observations in the field infection varied from slight to very heavy.

New Jersey: (Cook, August 1.) Abundant, but less than in 1918.

Oregon: (Barss, August 1.) One case reported.

South Dakota: (Champlin, August 1.) 50% on early varieties; 5-10% on late varieties. Frequent rains wash off the spray. A difficult disease to combat.

Tennessee: (Essary, August 1.) Very common in all parts. The loss is said to be

heavy in commercial potato sections, especially on the Cumberland Plateau.

Texas: (Taubenhaus, August 1.) Considerable, about 2% loss.

Virginia: (Fromme, August 1.) Common but not severe.

West Virginia: (Giddings, August 1.) Quite prevalent, especially in the southeastern section of the state. Evidently caused some injury even on the early crop.

Wisconsin: (Vaughan, August 1.) Small amount only.

Mosaic (cause undetermined).

Alabama: (Peltier, June 1.) About as bad as last year. Very prevalent throughout the state, especially on Triumphs.

Connecticut: (Clinton, August 1.) Less than usual. No complaints.

Georgia: (Berry, June 1.) Reports from all sections of the state but the mountain section. Individual reports of entire small fields being destroyed. Usually no tubers are formed. More destructive this season than combined effect of early and late blight.

(McClintock, August 1.) Developed on Triumph in more than 90% of all plants regardless of source of seed. Not especially serious on other spring crop varieties.

Idaho: (Hungerford, July 27.) Noted in the three counties, Twin Falls, Canyon and Washington, late in June. Slight amount in all cases.

Iowa: (Melhus, August 1.) Common on Bliss Triumph and Green Mountains. None found on Rural New Yorker.

Louisiana: (Edgerton) About 90% infection on Bliss Triumph. Scattered on other varieties. Loss not so great this year as last, as there was a smaller percentage of dwarf plants.

Massachusetts: (Osman, August 1.) Generally present but obscure and not likely to reduce the crop so much as in previous years.

Mississippi: (Beal, June 1.) General in potato growing counties of the state.

New Jersey: (Cook, August 1.) About 25% for the state.

Oregon: (Barss, August 1.) One field of California White Rose reported with considerable mosaic.

Tennessee: (Essary, August 1.) Very little if any has been observed this season.

Texas: (Taubenhaus, August 1.) Trace or 1/2 to 1% observed here and there.

Virginia: (Fromme, August 1.) Slight at Blacksburg.

Wisconsin: (Vaughan, August 1.) Small amount only.

Leaf roll (cause undetermined).

Connecticut: (Clinton, August 1.) Comparatively little seen except on Dibble's Russet and no complaints. Apparently less than usual.

Idaho: (Hungerford, July 27.) None noted in fields examined.

Louisiana: (Edgerton, August 1.) A small percentage in many fields. In a few small patches the percentage of infection is high but in most of the commercial fields the loss caused was small.

Massachusetts: (Krout, August 1.) Present in a large percentage of the fields. Most severe as a rule on native stock. Will undoubtedly very materially reduce the total production.

New Jersey: (Cook, August 1.) Less than usual. Abundant on Dibble's Russett which is grown to some extent in the northwestern part of the state.

Tennessee: (Essary, August 1.) Has been observed in a good many fields, but the damage seems to be slight.

Texas: (Taubenhaus, August 1.) 1/2-1% loss observed.

Scab caused by Actinomyces chromogenus.

Alabama: (Peltier, June 1.) Reported from all parts of the state and apparently is more severe than it has been the past three or four years. A large number of specimens that were so badly attacked as to be unfit for market have been examined. This and root rot are probably the most general diseases in Alabama.

Georgia: (Berry, June 1.) Especially noticeable in certain sections of the state. 90% of the tubers were affected in Lowndes County and in many of the mountain counties. It is especially severe this season.

Louisiana: (Edgerton, August 1.) Very common, with a rather heavy loss. Loss resulted mostly in high percentage of culls and a lower selling price for the potatoes.

Mississippi: (Beal, June 1.) Reported from a number of different counties, probably exists widely wherever seed is not treated before planting.

New Jersey: (Cook, August 1.) More abundant than usual.

Tennessee: (Essary, August 1.) Common and serious in the eastern section. There is more than the average amount of scab this season.

Tip burn, non-parasitic.

Connecticut: (Clinton, August 1.) A little observed, but not serious so far.

Iowa: (Bakke, July 1.) Common and destructive in the southern part of the state.

Massachusetts: (Krout, August 1.) Generally present and more severe than in previous years.

South Dakota: (Champlin, August 1.) 10% damage to early varieties.

Texas: (Taubenhaus, August 1.) About 3% loss.

West Virginia: (Giddings, August 1.) Quite prevalent, although we have had an unusually moist season. Loss this year indicates very clearly that Lutzman is correct in ascribing much of this to the direct action of the sun. We have had a very few unusually clear, hot days.

Wisconsin: (Vaughan, August 1.) The combined leaf hopper and tip burn injury with considerable flea beetle work, has been extensive in the southern counties. Potatoes in the northern counties, where farmers make potato raising a business, are looking fine.

Stem rot caused by Rhizoctonia solani.

Alabama: (Peltier, June 1.) A few cases observed in the vicinity of Auburn.

Georgia: (Berry, June 1.) Reported from all over the state. In some cases the loss is as high as 5%.

Massachusetts: (Osman, August 1.) About the usual amount.

New Jersey: (Cook, August 1.) Less than usual.

North Carolina: (Yocum, July 3.) Found rather frequently in the state, but not noted as serious at all except in one locality where it was unusually bad. It was supposed to have been brought in with Maine seed.

Black leg caused by Bacillus phytophthorus.

Indiana: (Gardner, August 1.) Found on several farms near Indianapolis affecting only occasional plants.

Iowa: (Melhus, August 1.) Common on early varieties. It commenced to appear during the latter part of June.

Oregon: (Barss, August 1.) Widespread and abundant. As high as 25% in some fields.

Vermont: (Lutman, August 1.) Observed by Gilbert near Rutland.

Other diseases.

Sclerotium wilt, caused by Sclerotium rolfsii, is reported as scattering in most fields in Louisiana with a loss of about 1%. No cases of stem end rot, due to this fungus, were observed in the Gulf Coast section by Peltier during the latter part of May. Potatoes in both field and grading sheds were gone over quite thoroughly. It was rather common in that section last year at that date.

A peculiar dwarfing of plants was noted in several fields in Idaho by Hungerford. The symptoms were not like those usually associated with curly dwarf as there was no curling of the leaves. Serious loss will occur in a number of fields from this trouble.

OATS

Smuts caused by Ustilago avenae and U. levis.

Kansas: (Results of Cereal Disease Survey, June 12-23.) Covered smut was found in 38 of the 51 fields inspected in amounts ranging from a trace to 20% (average 4.2%).

Loose smut was found in 34 of the 51 inspected fields in amounts ranging from a trace to 20% (average 3.4%).

Kentucky: (Results of Cereal Disease Survey, June 11-18.) In the 14 fields examined loose smut was found in 4 fields as follows: 1, 1/4, 4, t. No covered smut was encountered. Only one of the fields was planted with treated seed.

New York: (Results of Cereal Disease Survey, July 8-18.) Loose smut was found in 31 of the 78 fields inspected, minimum infection a trace, maximum 14% (average .96%). Covered smut was found in 45 of the 78 fields in amounts ranging from a trace to 48% (average 3.3%). The seed sown in 28 of the 78 fields was treated, 18 with formaldehyde 1-1, 10 with formaldehyde 1-40. The treatments were generally successful in controlling the disease. Eight of the fields sown with treated seed was infected, six of them in very small amounts, and in the other two the percentage of smut was high probably due to some mistake in the treatment.

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Covered smut was found in 17 out of the 33 fields inspected in amounts ranging from a trace to 10% (average 2.4%). None of the seed used in the 33 fields was treated.

Loose smut was found in 32 of the 33 fields in amounts ranging from a trace to 12% (average 3.7%).

South Dakota: (Champlin, August 15.) Two percent. Much of the seed is treated which accounts for the low percent of damage.

Leaf rust caused by Puccinia coronata.

Kansas: (Results of Cereal Disease Survey, June 12-22.) Reported from 33 out of the 51 fields examined in amounts ranging from 2-65% (average 15%). Found most often and in largest amounts in Anderson, Labette and Neosho

Counties. Three of the inspected fields were planted with Texas Red and all were infested. The variety was not given for three others, two of which were affected. All the rest were planted with Texas Rust Proof.

New York: (Results of Cereal Disease Survey, July 8-18.) Found in 23 out of 78 fields in amounts ranging from 5-25% (average infection 2.4%).

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) General, being found in 30 out of 33 fields inspected in amounts ranging from a trace to 60% (average 11.2%).

Stem rust caused by Puccinia graminis.

Kansas: (Results of Cereal Disease Survey, June 12-22.) One field out of 51 was reported as having a 10% infection of stem rust. The variety planted in this field, as in most of the fields in the state, was Texas Rust Proof.

South Dakota: 5% in early oats; 50% in late oats.

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Found in only 3 fields as follows: 15% in Logan County, and 10 and 5% in Stephens County.

Blast (Cause undetermined).

Kansas: Present in amounts from very slight to abundant in 34 of the 51 fields examined.

Kentucky: (Results of Cereal Disease Survey, June 11-18.) Observed in moderate to slight amounts in 5 out of 14 fields.

New York: (Results of Cereal Disease Survey, July 8-18.) Found in 31 out of 78 fields, in amounts from considerable to very abundant. Reported most often from Jefferson, St. Lawrence and Genessee Counties; in greatest amounts from Genessee County.

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Recorded in 28 of the 33 fields inspected in considerable amounts.

Bacterial blight caused by bacteria.

Kansas: Found in slight amounts in only one field, in Phillips County, of the 51 inspected.

New York: Four of the 78 fields inspected were affected with bacterial blight in amounts ranging from very slight to considerable.

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Found in 5 fields in Bryan County and 1 field in Stephens County in slight amounts.

Other diseases.

A disease said to be caused by Helminthosporium avenae was found in 20 New York fields of the 78 inspected in very slight to considerable amounts. Found in Jefferson and St. Lawrence Counties only.

Blotch, (cause not stated), was found in considerable amounts in one field in Dutchess County, New York.

RYE

Stem rust caused by Puccinia graminis.

Connecticut: (Clinton, July 15.) No complaints and no specimens seen this year.

Michigan: (Coons, July 15.) Not observed at time of harvest.

New Jersey: (Cook, July 1.) Slight.

South Dakota: (Champlin, July 15.) Very little.

Virginia: (Results of Cereal Disease Survey, June 4-17.) Trace found in two out of the 6 fields inspected.

Leaf rust caused by Puccinia dispersa

Connecticut: (Clinton, July 15.) No complaints and little seen. Probably less than usual.

Michigan: (Coons, July 15.) Quite common at time of harvest. Damage slight.

South Dakota: (Champlin, July 15.) Very little.

Virginia: (Fromme, June 4-14.) Found in 5 out of the 6 fields inspected in amounts ranging from 10 to 65%. Found in largest amounts in Augusta County.

Stem smut caused by Urocystis occulta.

Kansas: (Melchers, July 15.) Noted in importation of seed which was planted.

Iowa: (Bakke, July 1.) General throughout state.

South Dakota: (Champlin, July 15.) A trace in Rosen rye from Michigan. Not in native rye.

Virginia: (Results of Cereal Disease Survey, June 4-14.) Traces in three out of the six fields inspected.

Scab caused by Fusarium spp.

South Dakota: (Champlin, July 15.) About 5% in most fields.

Virginia: Found in all of the 6 fields inspected in amounts ranging from a trace to 6%. Found in largest amounts in Augusta County.

Anthracnose caused by Colletotrichum cereale.

Iowa: (Bakke, June 15.) Seriously affecting rye in the southern part of the state, in one case 35% infection.

Virginia: (Results of Cereal Disease Survey, June 4-14.) Found in 6 out of 6 fields inspected; considerable and very abundant. Found in largest amounts in Augusta County.

Ergot caused by Claviceps purpurea.

Michigan: (Bessey, July 15.) Common, but not doing much damage. Brine treatment coming into use.

TOMATO

Leaf blight caused by Septoria lycopersici.

Alabama: (Peltier, July 15.) Prevalent throughout the state. Causing serious losses in some localities.

Indiana: (Clark, July 21.) Owing to the dry weather which has prevailed during the last three weeks, there is as yet practically no outbreak of Septoria in this section. I have not found more than three or four plants infected with it in a number of fields that have been gone over within the last week or so.

(Gardner, August 1.) Septoria leaf blight has been common in the greenhouse tomato crop of Indiana. It is beginning to show up in the field crop at present. It is expected that it will be very serious on the field crop because of its prevalence in 1918 and because few growers practice spraying.

Mississippi: (Beal, July 15.) Common in every county in which Fields and Tims have been, but damage usually slight. Very little spraying done to control.

Texas: (Taubenhaus, July 15.) Considerable in all tomato sections. Ten per cent loss.

Early blight caused by Macrosporium solani.

Alabama: (Peltier, July 15.) Scattering over the state.

Louisiana: (Hollis.) General in all tomato sections visited during June and July causing rather slight damage in most cases but it was noted as very bad in Iberia Parish, where 20% reduction in yield is estimated. Practically all plants in that Parish were very badly affected. The large amount of rain was undoubtedly favorable for the disease.

Mississippi: (Beal, July 15.) Reported as being common by both Fields and Tims from almost every field seen. Damage usually slight.

Texas: (Taubenhaus, July 15.) Considerable in all tomato sections; 8% loss.

Fusarium wilt caused by Fusarium lycopersici.

Alabama: (Peltier, July 15.) Apparently not so serious as last year, as few reports have been received. Apparently, the introduction of the resistant varieties has influenced the reduction of this disease.

Indiana: (Gardner, August 1.) Fusarium wilt is undoubtedly the most serious trouble that greenhouse growers have had to contend with this year. It is very serious near Indianapolis, in some cases cleaning out entire houses. It has just been reported from Evansville on field tomatoes and has been found in Lake County.

Louisiana: (Hollis, July 15.) Common and causing rather severe damage in most localities visited in the state. Estimates of 10, 15, 25, 25 and 40% loss were made in different counties. In Iberville Parish four government wilt resistant varieties planted along with six commercial ones did not develop a single wilted plant while the commercial varieties showed considerable wilt. The government varieties were Arlington, Columbia, Marvelus and Norton. The commercial varieties were J. Baer, Glory, Maryland, etc.

Florida: (Clark, July 21.) The ten-acre field reported by Clark (Pl. Dis. Bul. 3:14, 1919.) later developed an average infection of 5-10% of the entire field, this being scattered, however, in areas of rather heavy infection interspersed with larger areas in which the infection was light or entirely absent.

During the first week in April a number of fields in the southern part of Dade County were visited. Fusarium was found in practically every field entered, in some cases running to 75 or 90% of the plants.

Mississippi: (Beal, July 15.) Most common and serious disease of the crop, excepting possibly blossom end rot. In all sections of the state.

Texas: (Taubenhaus, July 15.) Prevalent, but not serious; kept in check by rotation. One percent loss.

Bacterial blight caused by Bacillus solanacearum.

Alabama: (Peltier, July 15.) No reports or observations received at this sta-

tion this year.

Louisiana: (Hollis, July 15-18.) Found in Webster, Ouachita, Caddo and East Feliciana Counties, in amounts ranging from 2 to 20% (average damage about 10%).

Mississippi: (Beal, July 15.) Reported from two sections of Hancock County. Also found in George and Oktibbeha Counties. Probably widespread over counties along coast and long leaf pine section in south Mississippi.

Other diseases.

Blossom end rot is reported by Taubenhaus as causing 3% loss in Texas; and by Beal (Mississippi) as very general in the state and especially severe in the Crystal Springs area.

Wilt, caused by Sclerotium rolfsii, was found by Hollis on all tomatoes visited in Iberia County, and is reported by Peltier as causing serious loss in one instance in Alabama.

Collar rot (cause undetermined) has been causing a very great amount of damage in the southern half of Delaware this season. Many fields show a loss of 20% while in others the loss is total and the crop has been plowed up. Records were received at the Experiment Station from more than 75 farmers who were asking for help. LeCato has been able to find it in every locality visited. It was first reported June 7, occurring in the city beds. All varieties seem to be equally affected.

The disease causes a black stem, at or near, the surface of the ground and affected plants sooner or later may break off at this point of infection.

Mosaic is reported by Babcock June 19 from Ohio as occurring abundantly on some 4,000 tomatoes in greenhouses.

Root knot, caused by Heterodera radicicola, is reported from Mississippi and Louisiana.

Leaf mold, caused by Cladosporium solani, is reported by Gardner from Indiana August 1, as serious in the greenhouses near Indianapolis. Some of the worst infections ever reported to the Station were observed this year. Infections ranging from 25-100%.

A blight of tomatoes probably the same as that occurring in Washington and Oregon is reported in the Idaho Bi-weekly News Letter, July 25, as having made its appearance in both northern and southern parts of Idaho this season.

WHEAT

Bunt caused by Tilletia spp.

Arkansas: (Results of Cereal Disease Survey, June 6-10.) Bunt was found in one field (Hempstead County) of the 12 inspected. The infection was severe, being 23%. This field was one of the 3 for which the seed had not been treated; the seed for the other 9 fields had been treated with formaldehyde 1-40.

Colorado: (Leach, July 15.) Universally present, varying from a trace to 25 or 30% and higher. Treatment has proven effective where practiced.

Iowa: (Melhus, August 1.) State average about 2%.

Kansas: (Results of Cereal Disease Survey, June 12-23.) Bunt was found in 27 of the 114 fields inspected, in amounts ranging from a trace to 50% (average 1%).

Kentucky: (Results of Cereal Disease Survey, June 11-18.) Found in 21 fields out of 163 inspected in amounts of 1% or less except in one case where 40% of the heads were affected. The average percentage of bunt in all

fields was only .3%. The seed for 63 of the fields was treated, 22 with formaldehyde (wet) and 41 with copper sulphate.

New York: (Results of Cereal Disease Survey, July 8-18.) Reported from 34 out of 100 fields in amounts ranging from a trace to 16% (average .5%). Found in greatest amounts in Herkimer County and most frequently in Erie and Niagara Counties.

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Found in 12 out of the 98 fields examined in percentages as follows: t, 1, t, 3, 20, 1, t, 1, 1, 1, t, t, (average about .2%). Practically all the bunt was found in Jackson and Kingfisher Counties although examinations were made in 15 other counties. Only 5 fields were sown with disinfected seed.

Virginia: (Results of Cereal Disease Survey, June 6-14.) Found in 17 out of the 59 fields inspected, in amounts ranging from a trace to 9%. Found most frequently in Orange County. Twelve percent, or 3 out of the 24 fields of Bearded Winter wheat, and 33%, or 5 out of the 15 fields of Stoner wheat, were affected. One out of the 5 fields sown with seed which had been treated with formaldehyde had 1% infection.

Washington: (Heald, July 15.) Apparently more than last season, due to larger acreage of winter wheat. None to 55% in farm plantings.

Scab caused by Fusarium spp.

Arkansas: (Results of Cereal Disease Survey, June 6-10.) A trace of scab was found in 3 of the 12 fields inspected, all in Clay County. Two had been planted to wheat the year before, one to cowpeas.

Colorado: (Leach, August 1.) None observed in the state this year.

Idaho: (Hungerford, August 1.) No scab reported.

Iowa: (Melhus, August 1.) Percentage on affected heads in the state will average about 40%.

(Bakke, June 28.) General throughout the state. In the winter wheat growing sections of Johnson and Linn Counties this is the outstanding pathological trouble. In practically all cases 35% of all heads are affected. However, it rarely happens that more than one-fourth of the glumes are included.

Kansas: (Results of Cereal Disease Survey, June 12-23.) Scab was found in small amounts, averaging not more than 1% in 33 fields out of 114 examined. The greatest infection in any one field was 5%. One of the infested fields had been planted to corn the year before; all the others had been in wheat.

Kentucky: (Results of the Cereal Disease Survey, June 11-18.) Found in all but 3 of the 163 fields examined in amounts ranging from a trace to as high as 75%, affected heads (average 6.8%). Of the fields with scab about 24% of them were planted with corn in 1918, 24% with tobacco and 15% each with wheat, clover, and legumes, such as peas, beans, etc.

Maryland: Scab was found in 123 out of the 164 fields inspected in 15 Maryland counties. It varied in amounts from a trace to as high as 80% (average 5.2%). Of the 123 fields with scab 71 had been planted with Indian corn the year before, 3 with wheat, 12 with other crops, such as tobacco, tomatoes, etc. The rotation was not recorded for 35 fields.

No particular variety was noticed as especially susceptible or resistant.

Michigan: (Bessey, July 15.) Not observed on wheat.

New Jersey: (Cook, July 1.) Less than in 1918.

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Found in only 9 out of 98 fields in the following small percentages: 2, 10, 5, 2, 1/2, 1/2, 2, 1, 2.

Oregon: (Barss, August 1.) None reported.

Pennsylvania: (Orton, June 21.) Beginning to appear generally. In fields which follow corn the infection is about 10% on the average and where corn was not the previous crop the infection is about 3-4%.

South Dakota: (Champion, July 15 and August 1.) Twenty-five percent to 75% on Marquis, and 15-40% on Durum. Usually the later varieties scabs more than Marquis but this year the reverse is true. In the eastern third of the state it was estimated that 25% or more of the Marquis wheat was affected on July 15. The amount of scab varies greatly in different localities. For example, at Clark 1-3% infection is recorded, while at Redfield 25% or more occurs. At Clark the crop is a little later and more rotation is practiced. Redfield is a place of continuous wheat cropping or corn followed by a number of crops of wheat.

Washington: (Heald, July 15.) None.

Wisconsin: (Vaughan, August 1.) Serious, more than ever before. Estimated losses range from 10-50%.

Virginia: (Results of Cereal Disease Survey, June 4-14.) Found in 59 out of the 59 fields inspected in amounts ranging from a trace to 26%. One hundred percent of the fields sown with bearded winter and 100% of the fields sown with Stoner wheat were infested. Found in greatest amounts in Orange County.

Loose smut caused by Ustilago tritici.

Arkansas: (Results of Cereal Disease Survey, June 6-10.) Loose smut was present in amounts ranging from a trace to 6% (average 1.8%), in each of the 12 fields inspected. No hot water treatments were made.

Iowa: (Meilus, August 1.) Percentage of affected heads in the state about 1%.

Kentucky: (Results of Cereal Disease Survey, June 11-18.) Found in 135 of the 163 inspected fields. The disease ran as high as 10-15% in a few fields but as a rule the percentages were low, averaging .8% for the state as a whole. No treatments with hot water are recorded.

Maryland: (Results of Cereal Disease Survey, June 11-July 8.) Found in 143 fields out of the 164 inspected in amounts ranging from a trace to a maximum of 20% (average 3.6%). It will be seen that the disease was much more frequent than bunt and causing a considerably heavier loss. Only one field of wheat was found where the seed had been treated with hot water. No particular differences in the susceptibility of varieties was noted.

New York: (Results of Cereal Disease Survey, July 8-18.) This disease was reported from 60 of the 100 fields inspected, in amounts ranging from a trace to 5% (average .4%). No hot water treatments were recorded. There is no apparent difference in the susceptibility of varieties.

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Common in small percentages. Found in 73 out of the 98 fields examined in amounts ranging from a trace to as high as 12% (average 1.8%).

Pennsylvania: (Orton, June 21.) Very prevalent in all the counties visited. Infection seems most serious in Cumberland and Adams Counties where the average infection, by counting heads, will run about 5% with many fields more, some running up to 10-12%.

Virginia: (Results of Cereal Disease Survey, June 4-17.) Found in all of the 59 fields inspected, in amounts ranging from a trace to 15%. No hot water treatments were made.

Washington: (Heald) Small amount.

Stem rust caused by *Puccinia graminis*.

- Arkansas: (Results of Cereal Disease Survey, June 6-10.) Reported from all of the 12 fields inspected. Infection ranged from 5-65% (average 20%).
- Colorado: (Leach, August 1.) First found at Loveland, July 16. Has since become general over northern part of state and probably elsewhere. The rust did not reach a severe epidemic stage in any place as it came too late. Severe infection on grasses and wheat was found near barberry hedges at one place near Loveland.
- Idaho: (Hungerford, August 1.) Very little stem rust reported from any part of the state. Season has been extremely dry and there has been less rust than usual according to reports.
- Iowa: (Melhus, August 1.) Infection averages 20%.
(Bakke, June 15.) An interesting rust transference relation was noted on June 9 at Harcourt, Iowa, a short distance from Fort Dodge. There is a barberry hedge, 100 yards long, 6 feet tall and 20 years old. Just west of the hedge is a spring wheat field and along the fence a large amount of *Hordeum jubatum*. On this day the uredo spores of *Puccinia graminis* were found upon this grass. Microscopic examination made of spores and measurements show that it was the stem rust, *P. graminis*.
- Kansas: (Results of Cereal Disease Survey, June 12-23.) Found in 68 of the 114 fields inspected in amounts ranging from a trace to 25% affected leaf and stem area (average 4.6%).
- Kentucky: (Results of Cereal Disease Survey, June 11-18.) Found in slight amounts in 14 widely separated fields. Average trace.
- Maryland: (Results of Cereal Disease Survey, June 11-July 8.) Observed in 83 out of the 164 fields in amounts ranging from a trace to a maximum of 15% (average 2%) affected stem and sheath area.
- Michigan: (Bessey and Nelson, July 15.) Just beginning to appear at time of harvest. Damage slight.
- New Jersey: (Cook, July 1.) Very little.
- New York: (Results of Cereal Disease Survey, July 8-18.) Found in 15 fields out of 100 inspected, in amounts ranging from a trace to 5% (average .16%).
- Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Prevalent, being found in 89 of the 98 fields inspected. Percentage affected stem and leaf area as high as 65% in some cases with an average of 13.6% for the 98 fields.
- Oregon: (Barss, August 1.) None found in commercial fields.
- South Dakota: (Champlin, July 15-August 1.) About 50-100% infection on common wheat and 5-20% on Durum.
- Virginia: (Results of Cereal Disease Survey, June 4-17.) Found in 19 out of the 59 fields inspected, only a trace in each case. Forty-two percent or 8 out of the 19 fields sown with bearded winter and 40%, or 6 out of the 15 fields sown to Stoner wheat were infested.
- Washington: (Heald, July 15.) Very small amount in eastern Washington. No appreciable damage. One case of heavy infection from Pierce County.
- Wisconsin: (Vaughan, August 1.) More than reported for many years. Especially serious on late plantings. Plants infected range from 0-100%. Few fields free from rust.

Leaf rust caused by *Puccinia triticina*.

- Arkansas: (Results of Cereal Disease Survey, June 6-10.) Observed in large amounts, from 40-100% (average 57.5%), in all of the 12 fields visited.

Only one field was totally diseased.

- Colorado: (Leach, August 1.) First found near Rocky Ford June 1, where it reached the epidemic stage, doing considerable damage in many fields. It was present in small quantities in practically all places.
- Idaho: (Hungerford, August 1.) A trace to 10% of leaf rust noted in various localities visited. Practically no damage evident to date.
- Iowa: (Melhus, August 1.) Fifty percent infection.
(Bakke, June 28.) Much leaf rust, about 70%. Five percent present in Clayton County, near McGregor, and 10% near Mason City.
- Kansas: (Results of Cereal Disease Survey, June 13-24.) One hundred and eight of the 114 fields inspected were affected from 2-100% (average 27.2%).
- Kentucky: (Results of Cereal Disease Survey, June 11-18.) Observed in 117 of the 163 fields inspected. Average percentage affected leaf area was 18.8%.
- Maryland: (Results of Cereal Disease Survey, June 11-July 8.) Generally prevalent as it was found in 142 fields out of 164 examined. From 3 to 100% leaf area (average 42%), according to the scale for estimating rusts, was found to be affected.
- Michigan: (Bessey and Nelson, July 15.) Very common this year. All fields observed severely rusted, worse on spring wheat.
- New Jersey: (Cook, July 1.) About as usual.
- New York: (Results of Cereal Disease Survey, July 8-18.) In 46 fields out of 100 inspected, minimum infection 5%, maximum 60%, average 10.4%.
- Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Common but not destructive apparently. Found in 86 of the 98 fields inspected with an average of 30.5% affected leaf area.
- Oregon: (Barss, August 1.) Very small amount reported from several sections. Apparently widespread but never abundant.
- Pennsylvania: (Orton, June 21.) Extremely prevalent and severe throughout the southeastern part of the state. The infection averages 95%, and most fields show no trace of green leaves. This section includes Delaware, Chester, Philadelphia, Dauphin, Cumberland and Adams Counties. Judging from the appearance of the fields from the railroad the same condition exists in Lancaster, Northampton, Bucks and Montgomery Counties. As we get in the more mountainous sections the infection is not so serious. There will be a fair crop although the heads seem short and taper off at the tip.
- South Dakota: (Champlin, July 15-August 1.) Fifty percent to 100% on leaves of Turkey Winter and 40-80% on Marquis. Forty percent on common wheat. Very little on Durum.
- Virginia: (Results of Cereal Disease Survey, June 4-17.) Found in all of the 59 fields inspected ranging from 10-65%.
- Washington: (Heald, July 15.) Small amount. Can be found in many fields. No appreciable damage.
- West Virginia: (Berg, July 14.) Fairly abundant in all the counties visited by Mr. Berg on a trip during the latter part of June.
- Wisconsin: (Vaughan, August 1.) Present and causing serious defoliation on late plantings.

Black chaff caused by Bacterium sp.

- Arkansas: (Results of Cereal Disease Survey, June 6-10.) Eight fields out of 12 were infested with black chaff in amounts ranging from slight to considerable.
- Colorado: (Leach, August 1.) Several isolated cases reported during June, mostly from irrigated sections of south central part of state. Not very

severe in any case.

Idaho: (Hungerford, August 1.) Slight infection in Washington County. None elsewhere to date.

Iowa: (Melhus, August 1.) Average percentage infection 5%.

Kansas: (Results of Cereal Disease Survey, June 12-22.) Found in 68 of the 114 fields visited, in amounts from very slight to very abundant.

Michigan: (Bessey & Nelson, July 15.) None reported.

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Very common being found in 70 out of 98 fields examined and wheat was observed in 17 counties in the state. The disease ranged from very slight in some fields to very abundant in others. On the average it may be said to be moderate in severity and not causing heavy losses. Seventy-one percent of the 28 fields of Mediterranean Blue Stem and 61% of the 23 fields of Turkey Red were affected.

Oregon: (Barss, August 1.) None found.

South Dakota: (Champlin, July 15.) Two to five percent in some fields. As a rule less than one percent.

Washington: (Heald, July 15.) None.

Wisconsin: (Vaughan, August 1.) Very limited.

Anthracnose caused by Colletotrichum cereale.

Arkansas: (Results of Cereal Disease Survey, June 6-10.) Found in amounts ranging from slight to considerable in 5 out of 12 fields.

Kansas: (Results of Cereal Disease Survey, June 3-17.) Anthracnose was reported from 21 of the 114 fields inspected, in amounts from very slight to abundant. One field was reported with 20% infection.

Kentucky: (Results of Cereal Disease Survey, June 11-18.) Found in 15 of the 163 fields occurring in slight amounts in spots.

New Jersey: (Cook, July 1.) Very common and apparently very destructive.

New York: (Results of Cereal Disease Survey, July 8-18.) Found in 19 fields out of 100, reported in amounts from very slight to considerable.

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Found in very small amounts in 8 fields out of 98 inspected.

Virginia: (Results of Cereal Disease Survey, June 6-14.) Found in 45 out of the 59 fields inspected in amounts ranging from very slight to very severe. Fifty percent, or 12 out of the 24 fields sown with bearded winter and 100%, or 15 out of the 15 fields sown with Stoner wheat, were infested. Found in largest amounts in Amherst County.

Glume and leaf spots caused by Septoria spp.

Arkansas: (Results of Cereal Disease Survey, June 6-10.) Five fields out of 12 were reported as having Septoria present in very slight, slight or considerable amounts.

Iowa: (Melhus, August 1.) Average infection 1%.

Kansas: (Results of Cereal Disease Survey, June 12-23.) Reported as being very slight to abundant in 43 out of 114 fields.

Kentucky: (Results of Cereal Disease Survey, June 11-18.) Found in 124 fields out of 163, causing moderate to severe infection, particularly of the heads. One field showed 95% head infection.

Maryland: (Results of Cereal Disease Survey, June 11-July 8.) Septoria was recorded, especially on the heads, in 67 out of 164 fields. In fields where the disease occurred it was usually reported as being abundant to very abundant.

New York: (Results of Cereal Disease Survey, July 8-18.) Reported as being found in amounts from very slight to abundant in 48 fields out of 100.

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Common on heads and leaves being found in 40 out of the 98 fields examined.

South Dakota: (Champlin, August 1.) Severe on Durum wheat. Some on common wheat.

Virginia: (Results of Cereal Disease Survey, June 6-14.) Found in all of the 59 fields inspected in amounts ranging from slight to very severe. Found in largest amounts in Orange County.

Wisconsin: (Vaughan, August 1.) Often found on heads following or accompanying scab.

Other diseases.

Dying of wheat in patches was reported by Fromme from Virginia in Page, Rockingham and Roanoke Counties on July 1. The cause of the trouble is as yet undetermined.

Foot rot, said to be due to Helminthosporium, is reported from Colorado by Leach, June 30 as follows: "You may be interested to know that one of the fields which I suspected as being affected with "take-all" has been found to be a very severe infection of Helminthosporium. I have plated out a large number of diseased plants and from nearly all of them secured a pure culture of Helminthosporium. Other fields which I inspected proved to be a lighter case of this trouble, drought injury or over irrigation. I am beginning to feel that the disease does not occur in the state and sincerely hope that I am right."

Foot rot, the causal organism for which it has not yet been determined, was reported by Heald from Washington, July 15. It has been found in the following counties: Thurston, Moscow, (west side) Spokane and Klickitat (east side).

Root rots, caused by various organisms, particularly Rhizoctonia, are by Bessey from Michigan, July 15. Some damage on heavy soils. The roots were partially or entirely destroyed, damage to crop, varying, depending on degree of injury.

White-head: As a result of the cereal disease survey in Kansas, white-head was reported from 8 of the 114 fields inspected. Two fields showed 25%, 3 had 5% and 3 had considerable. Melchers, also, reports it as common in many wheat fields.

Ergot, caused by Claviceps purpurea, Tul., is reported by Vaughan from Wisconsin, August 1, as occurring in Rock, La Cross, St. Croix and Burnett Counties. Ergot is also reported by Bessey and Nelson from Michigan, July 15, as common but not doing very much damage. Brine treatment coming into use.

Weather injury, is reported by Bessey and Nelson, July 15, as follows: Many fields showing effects of wet, cold spring followed by continued hot and dry weather. Heads not well filled in many cases. Yield reduced 1-2%.

Stripe: As a result of the cereal disease survey, July 8-18, in New York, the disease was found in 2 fields in Onondaga County, and one field in St. Lawrence County - only 3 fields out of 100. Each field was infested to the extent of 5%.

Frost injury was reported by Heald from Washington July 15 as causing considerable loss just as the wheat was heading. Some fields were a complete loss, in others scattered, unfilled heads or blighted tips or butts were the result.

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THE PLANT DISEASE BULLETIN

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The Plant Disease Survey

VOLUME III.

NUMBER 5

August 15, 1919

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

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THE PLANT DISEASE BULLETIN

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THE PLANT DISEASE SURVEY

Vol, III

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BEAN

Anthracnose caused by Colletotrichum lindemuthianum.

Arizona: (Brown, August 15.) Not bad in state this year.

Louisiana: (Hollis.) General in Jefferson, Ouachita, and Rapides Counties and of moderate severity. In Rapides County 40% infection was estimated with about 3% of beans so badly damaged that their market value was materially affected.

New Jersey: (Cook, July 1.) Less than usual.

West Virginia: (Giddings, August 15.) Many plants appear to have been injured early in the season, but apparently no serious losses have occurred.

Wisconsin: (Vaughan, August 15.) Few reports, little damage.

Blight caused by Bacterium phaseoli.

This disease has been recently reported from Louisiana, Mississippi, New Jersey, West Virginia, and Wisconsin. In no instance was it reported as being very serious, although in Wisconsin there seems to be considerable of the disease. It is difficult to estimate the damage caused by it, however, in that state because of its similarity to sun scald.

Rust caused by Uromyces appendiculatus.

Rust is reported from Georgia, Louisiana, New Jersey, and West Virginia. In Louisiana it was noted in practically every bean field around Gretna, May 30. In West Virginia it was reported as being quite destructive in many local gardens, August 15.

Other diseases.

Mosaic was reported from Mississippi, New Jersey, and Wisconsin. During the latter part of April it was noted as being common at Crystal Springs on certain varieties. One field had 33% affected plants. In New Jersey it was reported as common July 1. In Wisconsin it is causing only a small amount of damage, August 15.

Sclerotium rolfsii was reported as being very prevalent July 1 in Texas on account of wet weather.

CABBAGE

Club root caused by Plasmodiophora brassicae.

Questionnaires have been returned from seven southern states, only one of them indicates the occurrence of club root. In Kentucky a small amount was reported in Kenton and adjacent counties.

Yellows caused by Fusarium ooglutinans

Alabama: (Peltier, June 15.) Apparently not so serious as last season, probably on account of adverse weather conditions. Season cool and extremely wet.

Arkansas: (Elliott, June 15.) Very serious, 10% loss.

Indiana: (Gardner, August 1.) The most prevalent and destructive cabbage disease in the state. It has become a limiting factor in many cabbage growing districts. From 15 to 20 cases of 15-90% infection have been observed.

Kentucky: (Miss Roe, June 15.) Two to five percent reported from Kenton and adjacent counties.

Louisiana: (Edgerton, June 15.) Very abundant and destructive this year. It has now spread all over the state. Many people have practiced buying plants that have been shipped in from other states and I believe that this is the cause of the very rapid spread of the disease.

Maryland: (Temple, June 15.) About as usual with considerable loss in trucking sections and home gardens. The Experiment Station is beginning the selection of resistant, early strains of cabbage.

Mississippi: (Beal, June 15.) Wide spread in state.

Oklahoma: (Learn, June 15.) Reported from one locality, May 7.

Tennessee: (Essary, June 15.) Very common and destructive in most parts of the state. In some gardens in the western section the loss is 90% or more.

Texas: (Taubenhaus, June 15.) Prevalent, 4% loss.

Black rot caused by Bacterium campestre.

Reported from Kentucky, Tennessee, and Texas. In Tennessee the disease is said to be very common, causing from 10 to 25% loss in affected gardens.

Black leg caused by Phoma oleracea.

Alabama: (Peltier, June 15.) Quite serious in the Mobile section. Scattering reports have been received from other places in the state.

Arkansas: (June 15.) Serious, causing about 2% loss.

Louisiana: (Edgerton, June 15.) Only a small amount this season.

Maryland: (Temple, June 15.) Widely distributed and causing considerable loss.

Mississippi: (Beal, June 15.) Can probably be found in all parts of the state where cabbage is grown. Heavy infection in parts of Lafayette County have been reported, and also general in Copiah County and around Crystal Springs.

Other Diseases.

Black spot caused by Alternaria brassicae was common in Louisiana, especially in the poorer drained soils.

CUCUMBER

Anthracnose caused by Colletotrichum lagenarium

Alabama: (Peltier, June 15.) Scattering reports, damage slight.

Indiana: (Gardner, August 1.) Common and quite destructive on greenhouse cucumbers near Indianapolis. It was especially prevalent where an overhead system of irrigation had been used.

Bacterial blight caused by Bacillus tracheiphilus.

Louisiana: (Edgerton, June 15.) Rather common on cucumbers, also cantaloupes. About 5% loss this year.

Ohio: (Babcock, June 19.) Present in greenhouses at Medina.

Downy mildew caused by Pseudoperonospora cubensis.

Reported from Florida and Louisiana only. In Louisiana it was found, especially on cucumbers in greenhouses.

Mosaic.

Reported from Florida, Louisiana, Massachusetts (greenhouse), Ohio (greenhouse), Indiana, and Texas. It was not said to be especially serious in any case except in Indiana where it was doing considerable damage under glass.

ONION

Smut, caused by Urocystis cepulae, was found causing some damage in Windham County, Vermont, and reported April 5 by A. H. Gilbert.

Downy mildew, caused by Peronospora schleideni, was reported from Louisiana during the latter part of May as causing some damage, especially to the seed, as in some cases it caused the stalks to fall over before the seed was mature.

Stem rot, caused by Macrosporium sarcinula and possibly other fungi, was reported June 1 by Edgerton as causing about 50% loss in the seed onion crop. It was also present in the field onions. The stems become covered with the black mold and rot and fall over. Loss was not so bad as in some years.

Pink root, caused by Fusarium malli, was reported by Taubenhaus as serious in Webb County, Texas, June 1, causing about 5% loss.

Tip burn was reported by Gardner, August 1 from Indiana as quite common on poor onion muck soils. The plants had a tendency to go down in hot, dry weather, due probably to lack of proper nutrition.

PEACH

Leaf curl caused by Eroscus deformas.

Illinois: (Anderson, August 15.) Serious in unsprayed peach orchards throughout the state. Not observed in sprayed orchards.

West Virginia: (Giddings, August 15.) Quite prevalent in some sections of the state.

Virginia: (Fromme, July 15.) Severe in unsprayed orchards or where dormant spray was applied too late.

Brown rot caused by Sclerotinia cinerea.

Illinois: (Anderson, August 15.) Very serious on market fruit. Many wholesale and retail dealers lost heavily on southern peaches. Some dealers reported 90% loss from brown rot. Not serious to date in southern Illinois orchards on account of very dry weather.

Louisiana: (Hollis, July 17.) Moderate. General in Caddo and Webster Counties.

Virginia: (Fromme, July 15.) Much more than usual. 50% loss of Carman's at

Warrenton in spite of three sprayings. Later varieties may not be so bad. Season wet and unusually favorable for brown rot.

West Virginia: (Giddings, August 15.) More prevalent than for several years past and will doubtless result in serious losses. Some orchards report that dusting has apparently had little effect in the control of brown rot.

Scab caused by Cladosporium carpophilum.

Georgia: (Armstrong, July 23.) Home grown peaches on markets in Hall, Rabun, Cobb, and Cherokee Counties show general scab infection.

Illinois: (Anderson, August 15.) Not observed on Illinois peaches to date.

Virginia: (Fromme, July 15.) Moderate to severe generally. Good control where thorough spraying is practiced.

West Virginia: (Giddings, August 15.) Very general and causing much injury in many orchards.

Black spot caused by Bacterium pruni.

Illinois: (Fromme, July 15.) Very serious on twigs in southern Illinois. Moderate infection on leaves and fruit.

Virginia: (Fromme, July 15.) Scattering, but usually does little damage. Very severe locally in Roanoke County, causing heavy defoliation accompanied by dropping of fruit. Most severe where lack of cultivation and fertility are evident.

Other Diseases.

Blight, caused by Coryneum beijerinckii, was reported from one orchard in Roanoke County, Virginia, which showed a severe attack, July 7. There was much defoliation and many twigs were with fruit, but no leaves. Will result in 25% loss of Carmans, not so bad on Elbertas. This is the first record for Virginia.

PEAR

Fire blight caused by Bacillus amylovorus.

Arizona: (Brown, August 1.) Fairly common in state, perhaps less than 1% of the trees are diseased. Nearly all county agents report blight and in one case the loss is as high as 3%.

Georgia: (McClintock, August 1.) Ninety-five percent of the pear trees more or less affected, some of them being killed by blight. About 75% twig blight on apples also.

Indiana: (Gardner, August 1.) Very severe and widely distributed through the state. In some sections it has made pear growing unprofitable.

Louisiana: Severe generally in Lafayette, Terre Bonne, Rapides, Jefferson, and Caddo Counties. In a good man orchards the disease was so severe that there will be no marketable fruit.

Mississippi: (Hesler, April 18-26.) General and very heavy infection in all sections visited.

Tennessee: (Essary, August 1.) About the usual amount all over the state.

Virginia: (Fromme, August 1.) More than usual. One orchard seen with 100% damage.

Other diseases. .

Crown gall, caused by Bacterium tumefaciens, is reported by Brown as being a serious menace to pear and other fruit trees in Arizona.

PLUM

Brown rot caused by Sclerotinia cinerea.

Connecticut: (Clinton, August 1.) Only one complaint so far, probably average season.

Iowa: (Bakke, June 11-27.) General throughout state on leaves, fruit and twigs.

Illinois: (Anderson, August 1.) Very severe this season on all susceptible varieties, causing twig blight in a number of localities early in the season.

Massachusetts: (Kroft, August 1.) Present, but not causing any great loss.

Michigan: (Coons, August 1.) Common, loss heavy. Spraying generally gives fair control.

New Jersey: (Cook, August 1.) Always present at ripening.

Ohio: (Selby, August 1.) General.

South Dakota: (Champlin, August 1.) Of little commercial importance as plums are not generally grown. Five percent infection on some home orchards.

Tennessee: (Essary, August 1.) Not serious, very light crop due to late frost.

Texas: (Taubenhaus, August 1.) Considerable, 20% loss.

Wisconsin: (Vaughan, August 1.) Small amount reported.

Other diseases.

Black knot, caused by Plowrightia morbosa, is reported by Selby as quite general on Damson varieties in Ohio, especially in the southern part. An unusual development also noted at one or two points in Athens County.

Black spot, caused by Bacterium pruni, is reported by Anderson as causing considerable loss of foliage in Illinois this season. It is also producing twig cankers which are seriously weakening the trees.

Plum pockets, caused by Exoascus pruni, is reported by Bakke, July 10, as rather common throughout Iowa but not destructive on well cared for orchards.

A disease showing typical silver leaf characteristics has been reported from Allegan, Michigan, by Coons. Whether or not this is the European silver leaf disease is a question. According to Coons the report will be verified by a field inspection.

PEAS

Blight caused by Ascochyta pisi.

Georgia: (Berry, June 1.) Reported from different parts of the state, especially from regions of heavy rainfall.

Maryland: (Temple, June 1.) About 200 acres failed entirely on account of blight and the peas were plowed under before harvest time.

Mississippi: (Beal, June 1.) General in the Crystal Springs district.

Wisconsin: (Vaughan, August 1.) First noted May 17, less than normal.

Also reported from Arkansas and Ohio.

Root rot caused by Fusarium spp.

- Alabama: (Peltier, June 1.) A few cases noted in gardens in the vicinity of Auburn.
- Colorado: (Leach, August 1.) Observed in several gardens from June 2 throughout the season. Considerable damage in some instances.
- Georgia: (Berry, June 1.) Several reports from home gardens.
- Maine: (Morse, July 15.) "We have had numerous complaints of a basal stem rot of pea this season, but not so many as in certain other wet seasons. We have no conclusive evidence, but think this is, as a rule, caused by a Fusarium. From conversations with pathologists from Maryland, New Jersey, and Wisconsin, I am inclined to think that our trouble is about the same as in those states."
- Maryland: (Temple, June 1.) "Becoming more serious each year. The disease has spread throughout the canning section and into almost all gardens. It does not cause total loss, but a rather reduced yield. The first year's work in selecting wilt resistant plants has been very promising of results. A few hundred plants out of several thousand have stood the test two years in succession."
- Michigan: (Coons, August 1.) Reported from MacMillan, Michigan.
- Wisconsin: (Vaughan, August 1.) Considerable. Disease is complicated with hot weather injury.

Other diseases.

Powdery mildew, caused by Erysiphe polygoni, has been reported from Alabama, Georgia, and Ohio in slight amounts.

Spot, caused by Septoria pisi, is reported by Vaughan as being first noted in Wisconsin June 1. Less than usual in amount.

Stem blight, caused by Bacterium pisi, has been observed in Colorado in less than the usual amounts. It is also common in certain seed lots in Michigan, causing slight losses.

A bacterial blight of an undetermined cause is reported by Vaughan as being rather abundant in some fields in Wisconsin. The injury is associated with sun scald.

REVUE
GÉNÉRALE

DE LA LITTÉRATURE FRANÇAISE

PAR M. L. J. B. DE LAUNAY

DE LA BIBLIOTHÈQUE NATIONALE

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UNITED STATES DEPARTMENT OF AGRICULTURE

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BARLEY

Covered smut caused by Ustilago hordei.

Arizona: (Lrown, August 1.) Loss slightly greater than that caused by loose smut. Probably about 1% crop loss.

Colorado: (Leach, August 1.) Very generally present, ranging from 1-10%. First observed May 29 at Fort Collins.

Iowa: (Results of Cereal Disease Survey, June 27-July 19.) Found in 5 fields out of 30 examined in amounts ranging from a trace to 4% (average .3%). Only 2 fields were sown with seed treated with formalin (wet method). Both of these fields were free from smut.

Kansas: (Melchers, August 1.) Present in most fields. State average loss about 4%.

Minnesota: (Stakman, August 1.) Reported from about 27 counties in the southern part of the state, usually in small amounts. Highest amount reported thus far about 8% in Dakota County.

Missouri: (Results of Cereal Disease Survey, June 12-28.) Three of the 6 fields inspected were infested in amounts ranging from a trace to 3% (average .8%). One field, not infested, was planted with seed treated with formaldehyde, 1-4C.

Montana: (Jennison, August 1.) Damage less than usual this year. This is probably due partly to the extreme dryness of the season and partly on account of more general and successful control treatments.

Nebraska: (Results of Cereal Disease Survey, July 1-2.) Found in 2 out of the 4 fields inspected as a trace and 3%. The trace was reported from a field sown with formaldehyde treated seed. State average .7%.

Ohio: (Results of Cereal Disease Survey, June 17-July 3.) Found in 6 of 10 fields inspected in amounts ranging from a trace to 15%. (Average 2.6%). Highest percentage found in Montgomery County.

Pennsylvania: (Results of Cereal Disease Survey, July 9-17.) Found in 9 of the 11 fields inspected in amounts ranging from a trace to 4%. (Average in State, .6%).

Tennessee: (Results of Cereal Disease Survey, May 30-June 2.) Found in 3 out of the 5 fields inspected in amounts of 8 and 10%. (Average 5.2%).

Vermont: (Lutman, August 1.) This smut, together with the loose smut, is estimated as causing from 2-5% loss in the state.

Loose smut caused by Ustilago nuda.

Arizona: (Lrown, August 1.) About 1/2% loss in the state.

Colorado: (Leach, August 1.) Observed first about June 1, ranging from a trace to 3%.

Indiana: (Gardner, August 1.) Not serious.

Iowa: (Results of Cereal Disease Survey, June 27-July 19.) Recorded from 20 of the 30 fields inspected in amounts ranging from a trace to 2% (average .5%).

Kansas: (Melchers, August 1.) Present in some fields. State average about 3%.

Minnesota: (Stakman, August 1.) Trace reported in about 32 counties. No reports of over 3%, mostly 1% or less.

Missouri: (Results of Cereal Disease Survey, June 12-28.) The 6 fields examined were infested in amounts ranging from a trace to 4% (average 1.5%).

Montana: (Jennison, August 1.) Upwards of 2% loss. It is doubtful if the losses caused by this disease have been diminished from that of previous years. In many fields the actual damage was difficult to determine on account of drought.

Nebraska: (Results of Cereal Disease Survey, July 1-2.) Found in 2 of the 4 fields inspected as 1 and 3%, state average 1%.

Ohio: (Results of Cereal Disease Survey, June 17-July 3.) Occurred in 5 of the 10 fields inspected in amounts ranging from a trace to 25% (average 3.1%). Highest percentage found in Montgomery County.

Tennessee: (Results of Cereal Disease Survey, May 30-June 2.) Observed in 4 of the 5 fields inspected in amounts ranging from 1-4% (Average 2.2%).

Stripe caused by Helminthosporium gramineum.

Colorado: (Leach, August 1.) Very severe and wide spread. Observed first about June 25, but was far advanced at that time. A few fields showed as high as 25% of plants completely killed.

Iowa: (Results of Cereal Disease Survey, June 27-July 19.) Reported as being very slight to very abundant in 14 out of the 30 fields examined. In one field 80% of the plants were affected.

Kansas: (Melchers, August 1.) Occurred in 1 or 2 instances where seed was brought in from other states. No great damage, however. It does not seem to occur in fields planted with native seed.

Michigan: (Coons, August 1.) Common. The early attack was exceptionally severe. Secondary infection checked on account of exceedingly dry, hot weather. The amount to be expected for next year, therefore, is small.

Minnesota: (Stakman, August 1.) Reports so far received indicate considerable stripe. Often the disease is associated with net and spot blotch.

Missouri: (Results of Cereal Disease Survey, June 12-28.) One field in Clark County slightly infested.

Montana: (Jennison, August 1.) No typical cases seen.

Ohio: (Results of Cereal Disease Survey, June 17-July 3.) Found in 6 of the 26 fields inspected, in amounts ranging from slight to very abundant.

Pennsylvania: (Results of Plant Disease Survey, July 9-17.) Present in 2 of the 11 fields inspected in amounts ranging from slight to considerable.

Tennessee: (Results of Cereal Disease Survey, May 30-June 2.) Found in 2 of the 5 fields examined in slight and considerable amounts.

Stem rust caused by Puccinia graminis.

Arizona: (Brown, August 1.) One county (Yuma) reported 1% loss on 500 acres. While rust is reported from other places, no loss is mentioned in connection with it.

Colorado: (Leach, August 1.) Generally present over state, but is not very heavily infested.

Iowa: (Results of Cereal Disease Survey, June 27-July 18) Found in 24 out of the 30 fields visited in amounts varying from a trace to 75% (average 16.9%).

Kansas: (Melchers, August 1.) Occurred in slight amounts in most fields.
No damage.

Michigan: (Coons, August 1.) Exceedingly common, probably doing damage up to 10%. Dry weather cut the crop in two.

Minnesota: (Stakman, August 1.) From reports so far received only a few cases of other than very slight infection have been found. There are one or two reports of from 10 to 20% infection.

Missouri: (Results of Cereal Disease Survey June 12-28.) A trace found in 1 of the 6 fields examined.

Montana: (Jennison, August 17.) None seen on barley.

Ohio: (Results of Cereal Disease Survey, June 17-July 3.) A trace to 3% found in 2 of the 10 fields examined.

(Van Pelt, August 1.) Light attack, not reported as general.

Vermont: (Lutman, August 1.) Five to 10% found locally at Burlington.

Spot blotch caused by Helminthosporium sativum.

Indiana: (Gardner, August 1.) Very common.

Iowa: (Results of Cereal Disease Survey, June 27-July 19.) Reported as ranging from slight to abundant in 9 of the 30 fields inspected.

Minnesota: (Stakman, August 1.) Common.

Missouri: (Results of Cereal Disease Survey, June 12-28.) Reported as being abundant in 5 fields out of the 6 inspected.

Ohio: (Results of Cereal Disease Survey, June 17-July 3.) Found in 2 of the 10 fields examined, ranging from slight to very abundant.

Pennsylvania: (Results of Cereal Disease Survey, July 9-17.) Found in 8 of the 11 counties inspected, ranging from very slight to abundant.

Tennessee: (Results of Cereal Disease Survey, May 30-June 2.) Found in 1 out of the 5 fields inspected. Reported from Putnam County as very abundant in one particular case.

Vermont: (Lutman, August 1.) 2-5% of leaves infected.

Net blotch caused by Helminthosporium teres.

Iowa: (Results of Cereal Disease Survey, June 27-July 19.) Reported as being slight to abundant in 17 out of the 30 fields inspected.

Missouri: (Results of Cereal Disease Survey, June 12-28.) Considerable amounts found in 4 of the 6 fields inspected.

Ohio: (Results of Cereal Disease Survey, June 17-July 3.) Found abundantly in 3 of the 10 fields examined.

Leaf rust caused by Puccinia simplex.

Iowa: (Results of Cereal Disease Survey, June 27-July 19.) From a trace to 75% (average 15.5%) was found in 17 out of 30 fields.

Missouri: (Results of Cereal Disease Survey, June 12-28.) A trace to 25% was found in 3 of the 6 fields examined, (average 12.5%).

Ohio: (Results of Cereal Disease Survey, June 17-July 3.) Reported from 1 of the 10 fields inspected.

Oregon: (Barss, August 1.) A trace reported.

Pennsylvania: (Results of Cereal Disease Survey, July 9-17.) Found in 6 of the 11 fields inspected in amounts ranging from a trace to 40% (average 10.9%).

Tennessee: Found in 1 of the 5 fields inspected as a 10% infection.

Scab caused by Fusarium spp.

Missouri: (Results of Cereal Survey, June 12-28.) All of the 6 fields inspected showed scab, ranging in amounts from .5% to 10% (average 3.7%). One field with 1% infection had been in wheat the previous year, the others in corn.

Ohio: (Results of Cereal Disease Survey, June 17-July 3.) Found in 2 of the 10 fields inspected, as a trace and 1%.

Pennsylvania: (Results of Cereal Disease Survey, July 9-17.) Found in 2 of the 11 counties inspected.

Tennessee: (Results of Cereal Disease Survey, May 30-June 2.) Found in 3 out of the 5 fields inspected in amounts varying from a trace to 40% (average 2%).

Other diseases

Ergot, was found in slight and very slight amounts in Iowa and Missouri by men engaged in cereal disease survey.

Powdery mildew, was found in a considerable amount in 1 of the 11 fields examined in Pennsylvania, and very abundant in one of the 5 fields inspected in Tennessee by men engaged in cereal disease survey.

Anthracnose, was found abundant in 1 of the 5 fields inspected in Tennessee by men engaged in cereal disease survey.

Leaf spot, was reported in 3 of the 30 fields examined in Iowa in amounts ranging from 10 to 20% (average 15%).

OATS

Smut caused by Ustilago avenae and U. levis.

Illinois: (Results of Cereal Disease Survey, June 18-28.) Of the 31 fields inspected, 7 were infested with covered smut, ranging from a trace to 4% (average a trace).

Loose smut was found in 28 fields in amounts ranging usually from 1% to 50% (average 5.9%).

Four fields were planted with seed treated with formaldehyde. All of these were free from covered smut; two had 1% and one a trace of loose smut.

Indiana: (Gardner, August 15.) Present about as usual.

Iowa: (Results of Cereal Disease Survey, June 27-July 18.) Covered smut was reported from 41 of the 78 fields inspected in amounts ranging from a trace to 8% (average .3%).

Loose smut was reported from 47 of the 78 fields examined in amounts ranging from a trace to 6% with the exception of one field in Scott County which had as high as 24% infection. The average amount for the state was .6%. Ten fields were sown with seed treated with formaldehyde 1-40, and 3 fields with formaldehyde 1-1. The treatments were usually successful in controlling smut, although the seed for the field with 24% infection was said to have been treated. Two other fields sown with treated seed showed some disease, one (dry method) having 1% and the other (wet method) having a trace.

Massachusetts: (Osman, August 15.) Very little smut this year as compared with other years, probably only a small fraction of 1%.

Minnesota: (Stakman, August 15.) Highest percentage reported so far is 8%. In most cases only a trace or 1 or 2% was found. Treatment apparently is not very general in the southern counties, but in the Red River Valley most of the seed was treated this year.

Missouri: (Results of Cereal Disease Survey, May 26-June 28.) Covered smut was found in 53 of the 101 fields examined in amounts to 20% (average 2%).

Loose smut was found in 74 of the 101 fields inspected in amounts ranging from a trace to 26% (average 2.9%).

Nebraska: (Results of Cereal Disease Survey, June 27-July 3.) Covered smut was reported from 7 of the 13 fields inspected in amounts varying from a trace to 6% (average .7%). One of the 6 fields sown with formaldehyde treated seed showed a trace of infection.

Loose smut was also found in 7 of the 13 fields inspected in amounts ranging from a trace to 3% (average 1%). Two of the fields sown with seed treated with formaldehyde showed a trace of infection.

New Jersey: (Cook, July 15.) Common, 3-10%.

New Mexico: (Leonian, July 15.) Can be found in almost every field, but is very slight.

North Dakota: (Bolley, August 15.) Not particularly abundant in the state this year, at least not so prevalent as in most years. The amount of infection depends largely upon the failure of the farmers to treat the seed. Treatment in state was almost universal, however.

Ohio: (Results of Cereal Disease Survey, June 17-July 3.) Covered smut was reported from 12 of the 26 fields inspected in amounts ranging from a trace to 24% (average 3.4%). Four cases of infection ranging from a trace to 14% were reported from the 6 fields sown with formaldehyde treated seed.

Loose smut was found in 18 of the 26 fields examined in amounts varying from a trace to 24% (average 4.7%). Three of the 6 fields sown with formaldehyde treated seed were reported infected, 2 with a trace and one with 7%.

Pennsylvania: (Results of Cereal Disease Survey, July 8-18.) Covered smut was present in 49 of the 122 fields inspected in amounts ranging from a trace to 16% (average .8%). No cases of infection were found in the 29 fields sown with seed treated with formaldehyde (wet and dry method).

Loose smut was found in 96 of the 122 fields examined in amounts ranging from a trace to 30% (average 2.3%). Prevalent in all the counties inspected, but, with the exception of a few cases, in small percents. Eleven of the 29 fields sown with formaldehyde treated seed were found to be infested.

Tennessee: (Results of Cereal Disease Survey, May 30-June 7.) Covered smut was present in 8 of the 38 fields inspected in amounts ranging from 1 to 40% (average 1.6%).

Loose smut was present in 27 of the 38 fields inspected in amounts varying from a trace to 25% (average 2.1%).

Vermont: (Lutman, August 15.) About the usual amount, 2-5%.

Wisconsin: (Vaughan, August 15.) Apparently much less than usual.

Leaf rust caused by Puccinia coronata.

Illinois: (Results of Cereal Disease Survey, June 18-28.) Infection was reported in 4 of the 31 fields inspected. All the infested fields were in Cass County.

Iowa: (Results of Cereal Disease Survey, June 27-July 18.) Seventy four of the 78 fields inspected showed leaf rust ranging from a trace to 65% (average 20.9%).

Missouri: (Results of Cereal Disease Survey, May 26-June 28.) Seventy nine of the 101 fields examined had infections ranging from a trace to 30% (average 5.9%).

Nebraska: (Results of Cereal Disease Survey, June 27-July 3.) Found in 4 of the 13 fields inspected in amounts from 5 to 25% (average 5.7%).

Ohio: (Results of Cereal Disease Survey, June 17-July 3.) Reported from 5 of the 26 fields examined in amounts ranging from 5 to 40% (average 2.3%).

Pennsylvania: (Results of Cereal Disease Survey, July 8-18.) Found in 43 of the 122 fields inspected, ranging from a trace to 100% (average 8.8%).

Tennessee: (Results of Cereal Disease Survey, May 30-June 7.) Reported from 12 of the 38 fields inspected in amounts ranging from a trace to 65% (average 4.2%).

Vermont: (Lutman, August 15.) Sixty to 70% on many fields around Burlington. As prevalent as last year when it was very serious. The Rhamnus cathartica question in New England might be investigated with profit.

Scab caused by Fusarium spp.

Iowa: (Results of Cereal Disease Survey, June 27-July 18.) Was reported from 38 of the 78 fields examined, ranging from a trace to 4% with as high as 45% in one field, Scott County, (average .6%). The disease was most commonly found in Cherokee, Clay, and Kossuth Counties.

Missouri: (Results of Cereal Disease Survey, May 26-June 28.) Traces of scab were reported from 19 of the 101 fields inspected.

Tennessee: (Results of Cereal Disease Survey, May 30-June 7.) Was noted in 5 of the 38 fields examined, ranging from 1/2 to 2%. All cases of infection were found in Davidson County.

Stem rust caused by Puccinia graminis.

Iowa: (Results of Cereal Disease Survey, June 27-July 18.) From a trace to 5% with an average of .1% was found in 35 of the 78 fields inspected.

Missouri: (Results of Cereal Disease Survey, May 26-June 28.) Observed in scattered localities in 10 fields of the 101 inspected, ranging from a trace to 16% (average .16%).

North Dakota: (Bolley, August 15.) Has done some damage to the later varieties of oats, but is not as destructive to oats as to wheat.

Blast cause undetermined.

Illinois: (Results of Cereal Disease Survey, June 18-28.) Blast ranging from slight to very severe was reported from 22 fields out of the 31 inspected.

Iowa: (Results of Cereal Disease Survey, June 27-July 18.) Reported as being from very slight to abundant in 62 fields out of 78.

Missouri: (Results of Cereal Disease Survey, May 26-June 28.) Very slight to very abundant in 70 of the 101 fields inspected.

Largest amounts found in Atchison and Saline Counties.

Nebraska: (Report of Cereal Disease Survey, June 27-July 3.) Found in 12 of the 13 fields inspected, amounts from moderate to very abundant.

Ohio: (Results of Cereal Disease Survey, June 17-July 3.) Found in 6 of the 26 fields inspected, in amounts from slight to 16%.

Pennsylvania: (Results of Cereal Disease Survey, July 8-18.) Found in 113 fields out of the 122 inspected in amounts ranging from slight to abundant.

Tennessee: (Results of Cereal Disease Survey, May 30-June 7.) Found in 25 out of the 38 fields inspected in amounts from very slight to abundant.

Bacterial blight caused by bacteria.

Iowa: (Results of Cereal Disease Survey, June 27-July 18.) Four fields out of the 78 examined were found to be infected in amounts from slight to abundant.

Missouri: (Results of Cereal Disease Survey, May 26-June 28.) Six of the 101 fields inspected were found to be infected in slight or considerable amounts.

Ohio: (Results of Cereal Disease Survey, June 17-July 3.) Found in 2 of the 26 fields inspected. Both cases found in Clinton County and reported abundant.

Other diseases.

Powdery mildew, is reported from Missouri and Ohio by men engaged in Cereal Disease Survey. In the latter state it was found in 2 of the 26 fields visited, in one case in moderate amounts, in the other 15%.

Anthraxnose, caused by Colletotrichum cereale was reported as very slight in one Missouri field.

Yellow leaf, is reported as being slight to abundant in 25 of the 101 fields examined in Missouri.

Black chaff, very slight in one field in Missouri.

Septoria, is reported in two fields in Missouri - one very slight and the other severe.

RYE

Stem rust caused by Puccinia graminis.

Minnesota: (Stakman, July 15.) Authentic reports received from seven counties, with one report of heavy infection. Earliest report June 20 from Blue Earth County.

Missouri: (Results of Cereal Disease Survey, May 26-June 28.) Twelve of the 16 fields inspected were infested with stem rust in amounts from a trace to 25% (average 4.6%).

North Dakota: (Bolley, July 15.) Not present to any marked degree on any field seen. Rye early and out of the way, furthermore, barberries in this region are mostly destroyed and rye is not a common crop hence infection not likely.

Ohio: (Results of Cereal Disease Survey, June 17-July 3.) Found in one out of 8 fields inspected.

Tennessee: (Results of Cereal Disease Survey, May 3-June 6.) Found in 3 out of the 12 fields inspected. Two fields showed a trace each and the other had 10%.

Leaf rust caused by Puccinia dispersa.

Illinois: (Results of Cereal Disease Survey, June 19-28.) Found in 6 of the 24 fields inspected, in amounts ranging from 5-10% (average 1.7%).

Minnesota: (Stakman, July 15.) Reported from 24 widely separated counties and said to be very abundant in some of these. The earliest report on winter rye was May 30, and on spring rye June 17, both at St. Paul.

Missouri: (Results of Cereal Disease Survey, May 26-June 28.) Infections ranged from 5-65% affected leaf area (average 19%). Disease was found in 9 of the 16 fields examined.

North Dakota: (Bolley, July 15.) Not particularly destructive.

Ohio: (Results of Cereal Disease Survey, June 17-July 3.) Found in 3 out of the 8 fields inspected in amounts ranging from 20-40% (average 11.2%).

Pennsylvania: (Results of Cereal Disease Survey, July 8-17.) Found in two fields out of the six examined, with about 10% affected leaf area in each case.

Tennessee: (Results of Cereal Disease Survey, May 30-June 6.) Found in 9 out of the 12 fields inspected in amounts ranging from 10-40% (average 13.3%).

Smut caused by Urocystis occulta.

Missouri: (Results of Cereal Disease Survey, May 26-June 28.) Two infections in 16 fields examined. In one of the fields there was a trace and in the other field considerable. In this latter field the seed was said to have been treated with formaldehyde 1-40.

Ohio: (Results of Cereal Disease Survey, June 17-July 2.) Found in 5 out of the 8 fields inspected in amounts ranging from a trace to 8% (average 1.6%).

Anthracnose caused by Colletotrichum cereale.

Illinois: (Results of Cereal Disease Survey, June 19-28.) Six of the 24 fields inspected were reported as having from slight to moderate infections of anthracnose.

Missouri: (Results of Cereal Disease Survey, May 26-June 28.) One slight infection in Atchinson County and 3 fields with from slight to considerable in Knox County. Found in 4 fields out of 16 inspected.

Ohio: (Results of Cereal Disease Survey, June 17-July 3.) Found in 1 out of 8 fields inspected in very slight amounts.

Pennsylvania: (Results of Cereal Disease Survey, July 8-17.) Found in all of the 6 fields inspected in amounts ranging from slight to severe.

Tennessee: (Results of Cereal Disease Survey, May 30-June 6.) Found in 6 of the 12 fields inspected in amounts ranging from slight to severe.

Scab caused by Fusarium spp.

Illinois: (Results of Cereal Disease Survey, June 19-28.) Infections averaging 3.8% were reported from 8 of the 24 fields inspected. One field showed 90% scab; in the remainder the amounts varied from a trace to 2%.

Two fields, including the badly diseased one, had been planted to corn the preceding year; in 5 the rye followed wheat, in one rye had been grown.

- Minnesota: (Stakman, July 15.) Found in 13 counties. In one field 50% of the heads were infected. In another field which had been planted to corn last year scab was abundant and *Gibberella* was found fruiting on the corn stubble. The earliest report was June 19 in Ramsey County.
- Missouri: (Results of Cereal Disease Survey, May 26-June 28.) From a trace to 15% (average .7%) was found in 12 of the 16 fields examined. Six of these fields had been in corn the year before, 3 in rye and one in wheat.
- Ohio: (Results of Cereal Disease Survey, June 17-July 3.) Found in three out of 8 fields inspected in amounts ranging from a trace to 5% (average .7%).
- Pennsylvania: (Results of Cereal Disease Survey, July 8-17.) Traces found in two out of 6 fields inspected.
- Tennessee: (Results of Cereal Disease Survey, May 30-June 6.) Found in 4 out of the 12 fields inspected in amounts ranging from a trace to 17% (average 1.6%).

Ergot.

- Illinois: (Results of Cereal Disease Survey, June 19-28.) Very slight to abundant in all but two of the 24 fields inspected.
- Missouri: (Results of Cereal Disease Survey, May 26-June 28.) Found in 4 fields out of 16 examined in very slight to considerable amounts.
- North Dakota: (Bolley, July 15.) Reported from many parts of the state and observed in numerous fields, but not quite as pronounced this year as in previous years. However, it is sufficiently abundant to indicate that this disease is to become one of the most destructive and difficult to handle of the rye troubles in this state.
- Ohio: (Results of Cereal Disease Survey, June 17-July 3.) Found in 3 out of the 8 fields inspected. Two cases are reported as severe and one case as considerable.

WHEAT

Bunt caused by *Tilletia laevis* and *T. tritici*.

- Illinois: (Results of Cereal Disease Survey, June 18 to 28.) An average of .3% of bunt was found in 10 of the 92 fields inspected; in Grundy County one field with 24%; in Mason County 7 fields with a trace and 2 fields with 1% each.
- Iowa: (Results of Cereal Disease Survey, June 27 to July 19.) Found in 49 out of the 214 fields inspected. In one field in Harrison County the amount of disease was 28%. In the others it ranged from a trace to 6% (average for state .5%). Most often found in Monona, Harrison, and Cass Counties.
- Missouri: (Results of Cereal Disease Survey, May 31 to June 27.) Found in 245 of the 562 fields examined, in amounts ranging from a trace to 40% (average 1.2%). The seed for 15% of these fields had been treated with formaldehyde. In 50 of the treated fields small amounts of smut were found. Thirteen fields were planted with grain treated

with copper sulphate in various strengths, and 4 of these showed traces of bunt. Only 13% of the 75 fields of Turkey Red wheat were affected, while 77% of the 22 fields of Harvest Queen showed disease. Fifty-five and 50 per cent of the fields of Red Wave and Fultz were affected respectively.

Montana: (Jennison, August 1). Three percent or more reduction in yield on spring wheat was brought about by bunt. Much effective treatment was done and it is believed that the drought tended to hold down the amount of infection.

Nebraska: (Results of Cereal Disease Survey, June 27 to July 3.) Found in 37 out of the 67 fields inspected in amounts ranging from a trace to 32% (average 2.4%). Four of the seventeen fields sown with formaldehyde treated seed showed smut, ranging from a trace to as high as 10%.

New Mexico: (Leonoan, July 1). Some fields very badly affected, but while generally present in state it is not causing heavy damage except in some isolated cases.

Ohio: (June 12 to July 3.) Found in 162 of the 283 fields inspected in amounts ranging from a trace to 42% (average 2.1%). Sixteen fields were reported treated with formaldehyde (wet method) and seven fields were said to have received formaldehyde dry method. Traces of bunt were found in 16 of these fields, the seed for which was treated, and in a few instances the percentage of disease ran considerably higher than a trace, probably due to some imperfection in the method of treatment.

Pennsylvania: (Results of Cereal Disease Survey, July 8 to 18.) Occurred in 12 out of 105 fields inspected in amounts ranging from a trace to 12% (average a trace). The disease occurred in highest percentages in Lehigh County. The seed for 6 out of 105 fields were treated with formaldehyde 1 to 40. No cases of infection were found in fields the seed for which had been treated.

Tennessee: (Results of Cereal Disease Survey, May 30 to June 7.) Found in 57 out of 177 fields inspected in amounts ranging from a trace to 15% (average .5%). Highest percentages observed in Davidson County. Only 3 out of 35 fields sown with treated seed showed disease in amounts ranging from a trace to 1%.

Loose smut caused by Ustilago tritici

Illinois: (Results of Cereal Disease Survey, June 18 to 28). Infections ranging from a trace to 2%, with 20% in 2 fields (in Jackson and Mason Counties), averaging .8%, were reported from 64 fields out of 92.

Iowa: (Results of Cereal Disease Survey, June 27 to July 19). Found in 130 of the 214 fields inspected in amounts ranging from a trace to 3% (average .3%). No hot water treatments were reported.

Missouri: (Results of Cereal Disease Survey, May 31 to June 27). Found in 522 out of the 562 fields inspected in amounts ranging from a trace to 18% (average 1.5%). No hot water treatment reported.

Montana: (Jennison, August 1). An estimated damage of 1% or more was done in spring wheats by loose smut.

Nebraska: (Results of Cereal Disease Survey, June 27 to July 3). Found in 45 out of the 67 fields inspected in amounts ranging from a trace to 6% (average 1.1%).

Ohio: (Results of Cereal Disease Survey, June 12 to July 3). Found

in 240 out of 283 fields inspected in amounts varying from a trace to 34% (average 2%). The disease is generally distributed throughout the counties inspected.

Pennsylvania: (Results of Cereal Disease Survey, July 8 to 18). Found in 97 out of the 105 fields examined in amounts ranging from a trace to 8% (average .7%).

Tennessee: (Results of Cereal Disease Survey, May 30 to June 7.) Found in 144 out of 177 fields inspected in amounts varying from a trace to 8% (average .8%). Prevalent in practically all counties inspected although in slight amounts.

Scab caused by Fusarium spp.

Illinois: (Results of Cereal Disease Survey, June 18 to 28.) In 113 of the 127 fields inspected (35 in Lake and McHenry Counties were not included in the averages for other diseases), there was an average amount of 3.1% of scab. The infection varied from a trace to 95%, usually between a trace and 5%. The most badly infested fields were in Jackson County.

Wheat had been grown in 39 of these fields in the year before, corn in 26, oats in 4, miscellaneous crops in 11; for the remaining 33 fields the rotations were not reported.

Iowa: (Results of Cereal Disease Survey, June 27 to July 19.) The reports show scab to be very prevalent and causing serious damage. A trace to 98% (average 41.8%) of the disease was found in 213 of the 214 fields examined. The estimated yield ranged from none to 35 bushels (average 11.8 bushels per acre). Rotations for these fields and corresponding amounts of infection were reported as follows; corn last year, 140 fields, average infection 40.9%; wheat last year, 19 fields, average infection 37%; oats last year, 16 fields, average infection 30.4%; miscellaneous 4 fields; rotation not reported, 35 fields. The accompanying tabulation shows the varieties most commonly planted with the number of fields and the minimum, maximum and average infection for each variety.

Variety	No. fields	No. following corn	Min. %	Max. %	Av. %
Marquis	87	67	4	98	66.8
Turkey Red	54	25	1.75	75	21.8
Early Java	31	23	5	85	37.2
Preston	5	5	3	17	8.1

Minnesota: (Stakman, August 15.) Reported in 48 counties, all but five of which are in the southern half of the state. Heaviest percentage of infection was reported from Rock, Martin and Faribault Counties in the southern tier. The disease is also very general along the northern banks of the Minnesota. Washington County, on the St. Croix, also is reported as having large amounts of scab. In most of the remaining counties the disease ranges from about 5 to 10% affected heads.

Marquis is most susceptible, although considerable disease is often reported on Velvet Chaff and Blue Stem. Neighboring fields of Marquis and Velvet Chaff showed 100% and 15% infections respectively. Many of the varieties on University Farm are found susceptible.

A seedling blight disease was very prevalent in the Red River Valley and some other parts of the state in the latter part

of May and early June. The scab organism was isolated from many of these seedlings, although *Helminthosporium* was often also present. The disease often appeared in spots causing a complete failure in the diseased area.

Missouri: (Results of Cereal Disease Survey, May 31 to June 27). The disease was found in all but 60 of the 562 fields inspected. The infections ranged from a trace to 90% (average about 4.2%). The crops planted in the affected fields last year were as follows: wheat, 309 fields; corn, 88 fields; oats, 36 fields; miscellaneous crops, such as rye, legumes, pasture, etc., 21 fields; not reported, 48 fields.

Nebraska: Found in 21 out of the 67 fields inspected in amounts varying from a trace to 10% (average 1.2%).

North Dakota: (Bolley, July 15). An especially heavy infection on the Durum and Marquis strains. Under wet conditions the destruction of the crop was great.

Ohio: (Results of Cereal Disease Survey, June 12 to July 3). Found in 252 out of the 283 fields inspected in amounts ranging from a trace to 80% (average 6.9%).

Pennsylvania: Found in 92 out of the 105 fields inspected in amounts ranging from a trace to 10% (average 1.1%).

Tennessee: Found in 143 out of 177 fields inspected in amounts varying from a trace to 30% (average about .8%).

Stem rust caused by Puccinia graminis

Illinois: (Results of Cereal Disease Survey, June 18 to 28). Found in amounts averaging 5/8% in 62 of the 92 fields examined. Infections ranged from a trace to 75% (2 fields in Jackson Co.), usually between a trace and 5%. No especially resistant or susceptible varieties were noted.

Iowa: (Results of Cereal Disease Survey, June 27 to July 19). Reported from 192 of the 214 fields examined in amounts varying from a trace to 100%, but usually ranging from 10 to 50% (average 20.1%).

Kansas: (Melchers, August 11). Present in varying amounts, but no damage recorded.

Minnesota: (Stakman, August 15). Has been reported in all but 14 of the Minnesota counties. Thirteen of these counties are north of the central portion of the state and have not been visited by the scouts.

Reports indicate a very large amount of damage. Infection of rust on plants varies from 9 to 100% and is very general. Scouts found grain nearly mature and even out in many cases, so that estimates were difficult. The estimate yields ranged from 8 to 15 bushels per acre. Scab is probably responsible for part of this damage.

Missouri: (Results of Cereal Disease Survey, May 31 to June 27). Found in amounts from a trace to 75% (average 7.8%) in 361 of the 562 fields inspected.

Montana: (Jennison, August 1). Insignificant and found in only one or two isolated cases. These occurred on wheat grown in the vicinity of barberries which had not been removed.

- Nebraska: (Results of Cereal Disease Survey, June 27 to July 3). Found in 22 out of the 67 fields inspected in amounts varying from a trace to 75% (average 1.6%).
- New Mexico: (Leonian, July 1). Generally present; not causing serious damage.
- North Dakota: (Bolley, July 15). Heavy general infection indicating destruction if weather conditions remain favorable.
- Ohio: (Results of Cereal Disease Survey, June 12 to July 3). Found in 21 out of 283 fields inspected in amounts varying from a trace to 50% (average 3.6%).
- Pennsylvania: Found in 35 out of 105 fields inspected in amounts ranging from a trace to 25% (average 1%). Fulcaster wheat was sown in 9 out of 11 fields inspected in Lancaster County where stem rust was most commonly found.
- Tennessee: (Results of Cereal Disease Survey, May 30 to June 7). Found in 8 out of the 177 fields inspected in amounts ranging from a trace to 8% (average .1%).

Leaf rust caused by Puccinia dispersa

- Illinois: (Results of Cereal Disease Survey, June 18 to 28). From 1% to 40% (average 12.7%) in 80 of the 92 fields inspected.
- Iowa: (Results of Cereal Disease Survey, June 27 to July 19). Reported in amounts ranging from a trace to 100% (average 48%) in 208 out of the 214 fields examined.
- Kansas: (Melchers, August 1). Very prevalent on leaves and stems.
- Minnesota: (Stakman, August 15). Very generally distributed and running as high as 100% affected area. Many reports of 25 to 60% are at hand. Reported especially from the southern part of the state.
- Missouri: (Results of Cereal Disease Survey, May 31 to June 27). Found in 505 out of 562 fields examined in amounts ranging from a trace to 100% (average 39%).
- Montana: (Jennison, August 1). Noted in a number of instances, especially on soft wheats. Restricted, however, to relatively small areas where abundant irrigation is given.
- New Mexico: (Leonian, July 1). Very abundant, especially in low, wet fields.
- Nebraska: (Result of Cereal Disease Survey, June 27 to July 3). Found in 63 out of the 67 fields inspected in amounts ranging from 10 to 100% (average 39%). It occurred in practically uniform amounts in all counties visited.
- North Dakota: (Bolley, July 15). This rust started early in the spring on seedling plants and was general throughout the state, resulting in heavy defoliation in the red stage at this time on most varieties of wheat.
- Ohio: (Results of Cereal Disease Survey, June 12 to July 3). Found in 212 of the 283 fields inspected in amounts varying from a trace to 100% (average 22.8%). Generally distributed throughout all counties with the exception of Delaware, Franklin, Lucas and Lorraine.
- Pennsylvania: (Result of Cereal Disease Survey, July 8 to 18). Found in 88 out of 105 fields inspected in amounts ranging from a trace to 65% (average 16.4%). Lancaster County showed the smallest amount of disease but it was very prevalent in all of the other counties inspected.

Tennessee: (May 30 - June 7.) Found in 159 out of 197 fields inspected in amounts varying from a trace to 100% (average 29.7%). Prevalent in all counties.

Black chaff caused by Bacterium sp.

Iowa: (Results of Cereal Disease Survey, June 27-July 19.) Reported from slight to very severe damage in 108 of the 214 fields examined.

Kansas: (Melchers, August 1.) From a trace to moderate infections in some fields. No damage recorded.

Minnesota: (Bisby, July 15.) Reported very general by cereal disease scouts, but none of the specimens sent in have shown the disease.

Missouri: (Results of Cereal Disease Survey, May 31-June 27.) Recorded from 285 out of the 562 fields examined in amounts ranging from very slight to very abundant. One field in Scott County was reported as showing 100% infection of the plants.

Montana: (Jennison, August 1.) In no instances have definite cases of black chaff been found even in districts where the disease caused from 50 to 90% reduction last year. Occasional leaf lesions have been seen, however, which may have been caused by the black chaff organism.

Nebraska: (Results of Cereal Disease Survey, June 27-July 3.) Found in 31 out of 67 fields inspected in amounts varying from very slight to severe.

North Dakota: (Bolley, July 15.) Disease not present in destructive form. Only traces have been apparent in fields examined.

Ohio: (Results of Cereal Disease Survey, June 12-July 3.) Reported from 2 of the 283 fields inspected in slight and moderate amounts. Both cases were found in Darke County.

Tennessee: (Results of Cereal Disease Survey, May 30-June 7.) Found in 3 of the 177 fields inspected in slight amounts.

Glume and leaf spots caused by Septoria spp.

Illinois: (Results of Cereal Disease Survey, June 18-28.) Three slight infections and one of 10% reported.

Missouri: (Results of Cereal Disease Survey, May 31-June 27.) Present in amounts from very slight to very abundant in 200 of the 562 fields inspected.

Ohio: (Results of Cereal Disease Survey, June 12-July 3.) Found in 116 out of the 283 fields inspected in amounts ranging from very slight to severe.

Pennsylvania: Found in 32 out of the 105 fields inspected (slight and severe).

Tennessee: (Results of Cereal Disease Survey, May 30-June 7.) Found in 108 out of the 177 fields inspected (very slight to severe).

North Dakota: (Bolley, July 15.) This root and seedling trouble has been very destructive throughout the year and generally throughout the state in fields and regions of rather constant cropping and destructiveness in many cases depends largely on the condition of the seed sowed. It is perhaps the most destructive excepting scab in scab epidemic invasions. The species of *Helminthosporium* constitute perhaps the most destructive wheat disease in this state this year.

South Dakota: (Champlin, July 15.) Considerable evidence on glumes especially of Durum varieties. Grains also affected.

Other diseases

Ergot, caused by Claviceps purpurea, is reported as a result of the Cereal Disease Survey, June 18 to 28, from one field in Mason County, Illinois, with a very slight infection.

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THE PLANT DISEASE BULLETIN

Issued By

The Plant Disease Survey

VOLUME III.

NUMBER 7

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BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

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ERRATA AND EXPLANATION

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- 21 Under apple, "Sphaeropsis malorum" should read "Sphaeropsis malorum".

Under apple, cedar rust, read "Gymnosporangium juniperi-virginianae" instead of "Gymnosporangium juniperi-virgininae".

- 22 Under apple, cedar rust, Pennsylvania, read "York Imperial" instead of "New York Imperial".

- 24 Under apple, anthracnose, Washington, read "Most injury is done by the fungus girdling small limbs" instead of "No injury is done by the fungus, etc".

- 25 Under bean, mosaic, "(McClintock, June 15) Less than 1% to date" should come under Georgia instead of Idaho.

- 29 Under peach, other diseases, read "A loss of about 5000 peach trees in the Lower Salt River Valley, Arizona," etc.

- 57 Under tomato, bacterial blight, Louisiana, read "East Feliciana" instead of "East Heliciana".

Under tomato, other diseases, read "Wilt, caused by Sclerotium rolfsii, was found by Hollis on all tomatoes visited in Iberia County, Louisiana".

- 63 Under wheat, other diseases, weather injury, read "Is reported by Bessey and Nelson from Michigan".

- 65 Under bean, mosaic, read "During the latter part of April it was noted as being common at Crystal Springs, Mississippi" on certain varieties".

- 67 Under onion, read "Stem rot, caused by Macrosporium sarcinula and possibly other fungi, was reported June 1 by Edgerton from Louisiana".

Under peach, leaf curl, read "Exoascus deformans" instead of "Exoascus deformas".

- 68 Under peach, black spot, Illinois, read "Anderson" instead of "Fromme".

THE PLANT DISEASE BULLETIN

Issued By

The Plant Disease Survey

VOLUME IV.

NUMBER 1

July 15, 1920

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

(Pages 2, 3, 4, 5 and 6 omitted)

THE PLANT DISEASE BULLETIN

Issued by

THE PLANT DISEASE SURVEY

Vol. IV

Number 1

NOTICES

The Plant Disease Survey in cooperation with the Office of Cereal Investigations is continuing the cereal disease survey of last year with special reference to take-all, and flag smut of wheat. Travel letters were issued July 1 to collaborators in the northern spring wheat states, and in addition, Messrs. B. H. Koehler, J. D. Dickson, and G. F. Weber, employees of the Cereal Office, are doing survey work on these diseases during July. The survey will be continued in the spring of 1921, beginning in the winter wheat states.

Last year the Plant Disease Survey in cooperation with the Federal Horticultural Board conducted a nation-wide search to determine the distribution of potato wart. Six new points of infestation were discovered in the bituminous mining section in western Pennsylvania and two in northern West Virginia. This season the search will be continued in Pennsylvania and West Virginia, and in addition, certain other localities which appear especially likely to be harboring wart will receive attention. The plans provide for the appointment of twelve to fourteen field men during the latter part of July. It is expected that five of these men will work together in Pennsylvania, five in West Virginia, and the remainder individually in other localities. The men will assemble for instruction July 20-22 at Freeland, Pennsylvania, where they will be met by Drs. Lyman and Weiss. Fuller details of the plans will appear in the next issue of the bulletin.

During the past three years in New York state the Plant Disease Survey was aided by the able assistance of about 175 high school teachers, farm workers, and other individuals who volunteered to send in information and answer questionnaires. This year an attempt will be made to gather the information directly from the 22 extension plant pathologists located in the various counties of the state.

Cooperative work on potato seed treatment is being continued between the Wisconsin and Iowa Experiment Stations. Demonstration plots have been planted at Wautoma, Wisconsin this year. A part of the seed was furnished and treated by the Iowa pathologists and a part was treated by the Wisconsin men. Plots at Ames, Iowa were also planted with the same treated and untreated seed.

CEREALSWHEAT

Scab caused by Gibberella saubinetii.

Reports from some of the eastern states, where wheat scab has been bad in certain other years, show that in those states the disease was much less prevalent on winter wheat than last year. This was probably on account of dry weather at heading time.

- Delaware: (Manns, July 1) Very limited, not one-third as severe as last year. Less than one-half of 1% injury.
- Virginia: (Fromme, July 1) Very slight in comparison with past two seasons. Could be found on occasional heads in nearly all fields but only trace in most. There were practically no rains during the heading period this year while rains were very frequent during the same period in 1918 and 1919.
- Kentucky: (Valleau, July 1) Early wheat nearly free. Late wheat about 4%. Much less severe than in 1919.
- Tennessee: (Hesler, July 1) Comparatively slight damage this year. Considerably less than 1% on average.
- Alabama: (Thiel, July 15) Only a trace of scab was found on the University Farm. A few inquiries in regard to the disease were received from the northern part of the state.
- North Dakota: (Bolley, July 15) Wheat scab is rather general throughout the state, in most cases appearing as a stool disease as yet. The abundance depending upon whether the wheat was on old stubble, and upon the nature of the seed used. Some fields are very badly infected. Whether this becomes very destructive or not, as in the case of rust, depends upon the condition of the weather within the next two or three weeks.
- Kansas: (Melchers, July 15) Reported in Labette County. Practically every field showed enough injury to reduce the yield from 1 to 6 bushels. Soft wheats are grown in this locality. No doubt there were traces in adjoining counties, but no reports came to hand.

Stem rust caused by Puccinia graminis.

Collaborators reports received to date indicate only slight trouble from stem rust in the more southern winter wheat states. Reports from most of the northern winter wheat states are not at hand and North Dakota is the only spring wheat state sending in notes. In that state the rust is rather widespread but not serious as yet. Future developments depend on the weather.

- Delaware: (Manns, July 1) None to be found.
- Maryland: (Temple, July 1) Only a trace here and there can be found.
- Virginia: (Fromme, July 1) Considerable in some wheat fields near Blacksburg, but coming too late for any serious injury.
- Kentucky: (Valleau, July 1) None observed or reported.
- Tennessee: (Hesler, July 1) Scattered infections throughout the state, but rarely severe. Worst cases have been observed in Greene, Davidson, Marshall, Wayne, and Warren Counties. The earliest report was June 8, and earliest report of telia was June 16 at Jackson.

Georgia: (McClintock, July 15) Some observed, but not serious. Wheat crop harvested here several weeks ago.

Alabama: (Thiel, July 15) Present in different sections of the state, ranging in severity from very slight to bad. At Auburn, stem rust did not appear until May 28, when many of the varieties were nearly mature and past the stage of infection. This is especially true of Preston, Marquis, Barietta, and Fultz. Infection on susceptible and late varieties ranged from less than 5% to 90%.

Oklahoma: (Learn, July 1) No report from this disease was received from any part of the state this year. It has not been severe enough to be noticed by the farmer. I spent a day in the wheat fields about Enid and I could only find a trace in the majority of the fields and in no instance did I find it abundant enough to be noticed by the farmer; not all fields showed even a trace. About Stillwater there was a trace with the exception of one field where it was quite abundant. On some of the experimental plots on the College Farm it was very abundant and parts of these plots were entirely killed. These plots were later in maturing than the others.

North Dakota: (Bolley, July 15) Aecial form of spores appeared in various portions of the state where barberry bushes had been undug early in the season and the red form of Puccinia graminis appeared rather evenly and generally on the wheat throughout the Red River Valley and eastward in the neighborhood of Fargo on date of June 22. At this date, July 8, it is becoming more abundant in certain fields and rather evenly distributed but as yet shows no marked signs of heavy infection. Whether there is a great destruction or not depends on the next 5 or 10 days. If it should be warm and damp the spread will be rapid and early enough to be very destructive.

Nebraska: (J. A. Faris, July 15) 30% of the crop cut shows no rust, 20% of the crop cut shows 10% loss; 45% of the crop not cut shows 15-25% loss; while 5% of the crop down shows 50% loss.

Kansas: (Melchers, July 15) Reported in fields of late growing varieties. In only a few cases would there be about 5% injury. Fields of Kanred growing along side show practically no infection.

Leaf rust caused by Puccinia triticina.

Leaf rust is common as usual but did not seem to be so destructive as normally in the Southeast where it is often serious.

Maryland: (Temple, July 1) Not as much as in 1919, but general over the state.

Virginia: (Fromme, July 1) Very common and infection unusually severe in all parts of the state. Many fields would rate 100% infection at harvest time. No estimate of injury possible. Wheat seems to have filled well in spite of severe rust and farmers are well pleased at prospect at this time.

Kentucky: (Valleau, July 1) Present, but losses from it very slight. Weather conditions have been unfavorable to its development. Comparatively cool and dry.

Tennessee: (Hesler, July 1) Very general over the state, but severe only on later-planted wheat. The chief varieties are Fultz and Fulcaster.

(C. Kurtzweil, May 20 - Exp. Sta. & Substa.) Leaf rust continued to increase in the leaf rust nursery. There is comparatively little leaf rust of wheat in the Station plats.

Alabama: (Thiel, July 15) Leaf rust present wherever wheat was grown. It was slow in spreading in the field this year.

Oklahoma: (Learn, July 1) This disease was present in all the wheat fields that I have visited this year, and in some very abundant. No reports were

received from over the state. The farmer does not consider it to be of any consequence.

North Dakota: (Bolley, July 15) Appeared in the red form early in the season when the plants were but a few inches high. Has as yet made no marked progress, only scattering pustules here and there.

Kansas: (Melchers, July 15) Practically no infection in the state. This is interesting in view of the great abundance in 1919.

Nebraska: (Peltier, July 15) Some leaf rust present but no great loss.

Loose smut caused by Ustilago tritici.

Collaborators in only three states have reported loose smut as yet (July 15). Frome, in Virginia, states that there was less than in 1919, and Hesler, in Tennessee, reports that county agents returns show an average of 2.2% in 30 counties.

Flag smut caused by Urocystis tritici.

"During June a survey for the flag smut was made in the vicinity of Granite City, Illinois. The disease was found in 111 fields, comprising 2500 acres. All these fields are located within the area quarantined last year on account of the occurrence of flag smut and the so-called take-all. In several fields only a small amount of flag smut was present. In a few cases, however, as much as 20 to 25% of the plants were infected. The amount of infection was usually very unevenly distributed in the fields." G. M. Reed.

Take-all (cause not definitely known).

The so-called take-all of wheat showed up again this year in Madison County, Illinois in experimental plots and in some commercial fields where the Red Cross and so-called Salzers Prize Taker varieties were planted on infested land. Mr. H. H. McKinney reported first finding it there about the middle of April.

Black chaff caused by Bacterium translucens undulocum.

The following note on black chaff, by C. D. Learn in Oklahoma, is of interest. He is the only collaborator reporting the disease as yet.

(July 1) "Reports were not received from as many different places over the wheat sections as last year, but the inquiries received were from new localities. Not a report was received from the places where it was very prevalent last year. I found traces of it about Enid and it was present in all the fields about Stillwater from a trace to 50% infection. One field near Stillwater where it was very prevalent last year was kept very close watch of this year to determine about the time it appeared. The first time the field was visited there were just a few plants that showed the disease, but when the grain was harvested it was badly infected, about 50% or more. The infection seemed to spread in about ten days. In one locality it seemed to be very bad as farmers reported it as killing the plant."

Leaf spot caused by Septoria sp.

Some of the cereal men at Madison, Wisconsin, found Septoria on old, green leaves of Turkey Red wheat as early as April 16. Both the wheat and the fungus had come through the winter in good condition and the parasite was active.

Root rot caused by various organisms.

Professors H. E. Bolley and L. E. Melchers have reported as follows on these troubles from their respective states of North Dakota and Kansas:

North Dakota: (Bolley, July 1) Spring wheat diseases showing their usual characteristic stages. In the old constantly cropped fields good examples of Helminthosporium and also fusarial root rot. In some cases the Helminthosporium acts quite characteristically like ~~all~~ of winter wheat. No doubt it would take on these characteristics much more definitely if it were not for the fact that under our spring conditions spring varieties run up with very much greater rapidity, and the atmosphere here is less moist than in the winter wheat regions.

Kansas: (Melchers, July 15) Various root rots have appeared. Indications are that species of Alternaria, Fusarium, and Helminthosporium are the chief organisms involved. In the case of the Alternaria the nodes become brittle and the culms break off at this place when the heads are about one-half developed. Plants are affected in spots in the field. The Fusarium and Helminthosporium root rots cause a darkening of the culms above the crown and a distinct root decay takes place. These troubles are being investigated.

OATS

Very little data on oat diseases have been received this year. Crop reports indicate a good crop generally except for short heading due to insufficient moisture in some states. Probably there is about the usual amount of oats smut although Manns, in Delaware, reports less than usual.

Crown rust caused by Puccinia coronata.

Reports from some of the southern states indicate this as abundant this year.

Tennessee: (C. Kurtzweil, June 21) Oat leaf rust has increased very much the past week. Professor Essary reports as high as 100% in Henderson County.

Alabama: (Thiel, July 15) Infection very heavy on varieties on the University Farm. Reports from other sections of the state indicated that the rust was general throughout the state.

Mississippi: (Neal, July 1) Leaf rust was noted by Beal to be about the same this spring as last season. Probably 2% reduction in yield for the state.

Louisiana: (Edgerton, July 15) Crown rust very severe this season even on the resistant varieties. Noticed some susceptible varieties that did not head.

RYE

Stem rust caused by Puccinia graminis.

Maryland: (Temple, July 1) Very little in Maryland.

Virginia: (Fromme, July 1) Rather common in southwest Virginia but only slight injury.

Georgia: (McClintock, July 15) Observed to some extent but not serious this year.

North Dakota: (Bolley, July 15) Not yet observed.

Nebraska: (Peltier, July 15) Very slight.

Leaf rust caused by Puccinia dispersa.

Maryland: (Temple, July 1) About as in former years.

Virginia: (Fromme, July 1) Common but not severe.

Georgia: (McClintock, July 15) Some, but not serious.

Tennessee: (Hesler, July 1) General and severe in practically all sections of the state.

(C. Kurtzweil, May 10) Leaf rust of rye is very plentiful in fields on the Station farm.

Wisconsin: (Johnson, May 3) Found our first infection here of leaf rust of rye today.

North Dakota: (Bolley, July 15) Scattering infection.

Nebraska: (Peltier, July 15) Very slight.

Scab caused by Fusarium sp.

Tennessee: (Hesler, July 1) Indications are that it is general in the state, from a trace to 50% of heads observed being affected.

Loose smut caused by Ustilago sp.

A few heads of rye showing loose smut have been found this season by members of the Cereal Office at the Arlington Farm of the Department of Agriculture in Virginia. G. M. Reed and F. D. Fromme found one affected head on the experimental farm at Staunton, Virginia, and H. S. Jackson and A. G. Johnson found six heads on Rosen rye at Wanatah, Indiana, June 17.

FRUITSAPPLEScab caused by Venturia inaequalis

Scab is reported as being less abundant than usual in New York, Michigan and Wisconsin, but in parts of New England, Delaware, Ohio, Illinois and Tennessee it is said to be prevalent and will undoubtedly result in serious losses.

- New Hampshire: (Butler, July 1) Generally distributed. Will probably cause considerable loss on McIntosh Red, Greening, Gravenstein, and crab apples.
- Massachusetts: (Osmun, July 15) Severe infection throughout the state, especially on McIntosh. Weather conditions have favored development of the fungus.
- Connecticut: (Clinton, July 1) Moderate to plentiful on McIntosh and Fall Pippin. More plentiful on fruit of Fall Pippin than McIntosh. In all cases well controlled by spraying.
- New York: (Chupp, July 1) Very slight in all sprayed orchards. A few unsprayed orchards show considerable scab. Relatively, however, the disease is unusually rare, due to the abnormally dry weather. According to the observations of the field men, infection occurred April 27-29, May 10-11, June 17-19. There were no long rainy periods.
- New Jersey: (Cook, July 1) Present. Too early for definite statement.
- Delaware: (Manns, July 15) Scab quite severe on susceptible varieties.
- Virginia: (Fromme, July 15) Severe in some sections and moderate to slight in others. Severe - Frederick, Rockingham, Montgomery Counties and probably all through the Valley. Good thorough spraying has held it well in most cases. Slight in Piedmont and Middle Virginia. First record May 21.
- Kentucky: (Valleau, July 1) Present, but extent of injury unknown.
- Tennessee: (Hesler, July 1) The usual precipitation since March 1, 1920, has favored the scab fungus very greatly. It is general over the state in home orchards. In most commercial orchards spraying has evidently been done too late, especially the "pink-bud" application, which in many cases was omitted entirely. Pedicel infection of the fruit has been heavy this year. In one orchard of over 200 acres, it is estimated that 40% of the fruit will soon drop on account of scab lesions on the pedicels. County agents also report heavy losses from this source. Bordeaux mixture, lime sulphur, soluble sulphur, are among the sprays used.
- Georgia: (McClintock, July 15) None observed to date.
- Arkansas: (Elliott, July 1) Severe infection on unsprayed fruit. Almost completely controlled by petal-fall spray.
- Ohio: (Selby, July 1) The season in Ohio has been marked favorable weather leading to heavy and medium early infection of fruit and leaves of apple, as early as June 2. Specimens of apple leaves consisting of leaf shoot clusters largely covered by scab fungus were received from Athens County. Scab susceptible varieties have been marked by the early spread of the fungus

over the leaves. Spraying has been generally practiced by apple growers, yet post-blossom infection of the fruit as well as the leaves, is extensively reported.

Illinois: (Anderson, May 21) Apple scab appeared in the orchards about Urbana on May 16. This is quite late, but we have had very unusual weather this spring and it has been even too cold and rainy for apple scab. I found the ascospores shooting on the leaves under the trees on April 20. They were still shooting on May 19.

(July 1) Very serious on fruit and foliage in central and northern Illinois. Many orchards lost nearly entire crop where they failed to put on cluster-bud spray. Light attacks only in southern Illinois.

Michigan: (Coons, July 1) Less scab than usual. To be accounted for by one month drought following blossoming time.

Oklahoma: (Learn, July 1) Just one report so far this year from this disease. Reports of this are expected later.

Wisconsin: (Vaughan, July 1) Less than usual. We had a number of days of hot dry weather while the leaves were forming and fruit setting.

South Dakota: (Michel, July 1) Quite common because there are few if any preventative measures taken. This has been an especially good year for the development of the disease, some trees having 90% of the apples malformed because of this disease.

Oregon: (Barss, July 1) Occurrence general but no indication of great severity from present reports.

Fire blight caused by Bacillus amylovorus

A number of states have reported considerable fire blight on susceptible apple varieties. The individual reports are given below. New Hampshire, New Jersey, Delaware and Oklahoma reported practically none of the disease.

Massachusetts: (Osmun, July 15) More than usual. Quince and pear perhaps more severely attacked.

Connecticut: (Clinton, July 1) Becoming more or less common on twigs of Greening. Not yet observed on other varieties, although one specimen on Tolman Sweet was sent for identification.

New York: (Chupp, July 1) About the same amount as usual. In some orchards, and particularly on some varieties, the trees are severely blighted.

Virginia: (Fromme, July 15) Very much localized this year. Very severe in southwest corner of state. Practically none in Valley section and Piedmont.

Tennessee: (Hesler, July 1) General over the state. Perhaps the most conspicuous disease extant. Blossom-blight and twig-blight are the chief forms of the disease this year, although some varieties show a heavy loss from fruit-blight. Yellow Transparent and Hoover have shown especial susceptibility, although proximity to hold-over cankers is a factor in damage to all varieties. In many cases the source of the trouble was traced to a pear tree near the apple orchard. Perhaps one of the serious phases of fire-blight consists in the fact that the black rot fungus (Physalospora cydoniae) gets on twigs previously killed by the blight organism and then spreads to the leaves and fruit below.

- West Virginia: (Sheldon, June 1) Appeared on cultivated and seedling apples and on wild crab apples in small amount in vicinity of Morgantown about June 1, 1920. Has developed rapidly since a recent rain. I know of one man who is removing the dead twigs.
- Georgia: (McClintock, July 15) Abundant, due to the wet weather during the spring.
- Ohio: (Solby, July 1) As indicated in last year's report of Ohio diseases (See Report State Hort. Soc., 53:59 1920), the amount of fire blight infection has been much below normal or average. Several growers, by prompt cutting and burning of infected parts of pear trees were able to prevent extended infection of blight organism on pear and apple.
- Illinois: (Anderson, July 1) Reported from various parts of the state as causing serious loss to fruit when apples were about one-half inch in diameter. Little blossom blight. Twig blight developed rather late in the season, but not serious except on Yellow Transparents and Jonathans.
- Michigan: (Coons, July 1) Considerable blossom blight, which, however, has not advanced. Loss slight if any.
- Wisconsin: (Vaughan, July 1) Less than usual. Only a few reports to date. Some crab trees under observation that were black last year at this time are now entirely free from indications of fire blight.
- Arkansas: (Elliott, July 1) Bad on Jonathans, other varieties not severely attacked.
- North Dakota: (Bolley, July 1) North Dakota is not an extensive grower of apples. There are, however, a good many small plantings of several varieties of apples such as Patton Greenings, Siberian Crabs, etc. The latter are badly attacked at the present time by the bacterial fire-blight of apples.
- South Dakota: (Michel, July 1) Very little fire blight was observed in an orchard which usually shows a great deal of it. This may be due to the fact that the most susceptible trees have been already killed.
- Nevada: (Lantz, July 1) Seems to be more common than usual. I have observed some trees in which 50% of the twigs were blighted. First report of the disease was June 14 in the vicinity of Reno. Some growers attempt to control the disease by pruning off diseased twigs.
- Oregon: (Farss, July 1) Reported as unusually prevalent and destructive on apples, particularly Spitzenbergs (Ocosopus) in the Rogue River Valley. Some reported from the Umpqua Valley (Douglas County).

Blotch caused by Phyllosticta solitaria

- West Virginia: (Sheldon): Fruit shipped in is badly diseased. There is scarcely a fruit visible in some baskets that is not blotched, some half covered. Selling at 12 cents a pound at Morgantown.
- Tennessee: (Hosler, July 1) General and destructive in the state, especially on the early varieties, although Delicious and Black Ben were found badly attacked in one orchard in middle Tennessee. Twig and fruit lesions only; no leaf infections observed to date, except in certain cases lesions were noted on leaf pedicels.

Ohio: (Selby, July 1) Blotch, in the form of twig cankers has been collected and reported over the southern half of the state. Extended cooperative spraying tests for blotch control are being conducted by the Extension Service of the Ohio State University, under the direction of Professors Beach and Stover.

Illinois: (Anderson, July 1) Heavy infection in all parts of state where blotch is prevalent. Will cause 50-90% loss in some orchards where spray was not applied at the right time or where no sprays were applied.

Arkansas: (Elliott, July 1) Very severe on Limbertwigs, Red Astrachan, Yellow Transparent, and Ben Davis group where sprays were not properly applied. Infection worse than usual.

Cedar rust caused by Gymnosporangium juniperi-virginianae

Some good notes on cedar rust have been received from Virginia, Tennessee and Illinois. Attention is called particularly to the "developmental notes" by Hesler in the Tennessee report. This is just the sort of data that should be filed with, and summarized by, the Plant Disease Survey. An accumulation of reports of this kind from all states where cedar rust is a factor would doubtless throw new light on such questions as, time and length of infection periods, influence of weather on the disease, time for spraying in different localities, etc. It is hoped that contributors will be able to collect and report more of this type of information.

It is of interest to note that Illinois is compelling the eradication of cedars in certain parts of Union County.

Virginia: (Fromme, July 15) Very severe again in Valley section except where protection has been obtained by cedar eradication. Frederick County cut practically all cedars and has practically no infection. Unusual number of complaints this year from group of counties east of Blue Ridge - Buckingham, Cumberland, Powhatan, Nottoway and Campbell.

Tennessee: (Hesler, July 1) Found generally over the state, the severity of infections depending on the proximity to red cedars, Wealthy, Champion, Delicious and Ben Davis were found showing very heavy leaf infection. Delicious also showed fruit rust-lesions.

Developmental notes: March 20, galls on cedars showing horns just beginning to break through. March 24, horns 1/16 inch long. March 28, rain on the night of the 27th and on the morning of the 28th. At 9 a.m. trees (cedars) still wet and horns gelatinized and out fully 3/16 inch. April 2, galls gathered appear as if they had functioned, horns collapsed and dry. Subsequent dates, galls apparently functioning repeatedly, single galls producing several crops of sporidia (number not determined). June 3, pycnia on apple leaves this date. No aecia as yet. June 12, only pycnia, no aecia. June 20, aecia just beginning to show.

Illinois: (Anderson, July 1) Heavy infection in southern Illinois on susceptible varieties. The Illinois State Department of Agriculture has made a survey of red cedars in Union County and is compelling the owners to cut these out in all sections where orchards exist in the neighborhood. All red cedars have to be cut out by January 1, 1921. This is the first serious effort in this state to control rust by elimination of red cedars. Union County is one of the main fruit growing counties of the state. (See public notice of Director Department of Agriculture, Springfield.)

Black rot caused by Physalospora cydoniae

- Massachusetts: (Osman, July 15) This disease has been prevalent the present season on account of wet weather, and has caused considerable defoliation, especially early in the season. Little fruit infection has appeared up to the present time.
- Connecticut: (Clinton, July 1) Considerable infection on foliage early in the season. No difference in susceptibility of varieties noted. Fairly well controlled by spraying in most cases.
- New Jersey: (Cook, July 1) Appearing in many localities.
- Virginia: (Fromme, July 15) Very severe on unsprayed orchards all over the state. A small home orchard in Wise County had 50% defoliation and 100% infection on June 23. Orchards sprayed three weeks after bloom spray seem to have had good protection. First record May 21.
- Ohio: (Selby, July 1) Black rot was developed noticeably in 1919 upon both twigs and fruit of apple in Ohio following lime sulphur spray. The canker development upon twigs and branches is very prevalent. From present indications the cool moist weather conditions are leading to extensive infection of fruit and new growths.
- Illinois: (Anderson, July 1) Causing serious leaf spotting in southern Illinois orchards. More prevalent on foliage than usual.
- Tennessee: (Hesler, July 1) Leaf infection general over the state. In a great many cases the fungus had followed 1919 twig-blight (caused by Bacillus amylovorus) and had then spread to the leaves below. Black rot cankers not commonly reported. The disease on the fruit is chiefly of the "blossom-end rot" type, and is doing most damage to early varieties, such as Early Harvest, Red Astrachan and Yellow Transparent. Also observed on Delicious and Ben Davis fruit.

Bitter rot caused by Glomerella rufomaculans

- Massachusetts: (Osman, July 15) This disease seems to be causing more than the usual amount of trouble, especially in the eastern part of the state.
- New Jersey: (Cook, July 1) One report. Much earlier than usual.
- Delaware: (Manns, July 15) Bitter rot severe on some varieties.
- Tennessee: (Hesler, July 1) Just beginning to show. Found at Jackson on Yellow Transparent and at Columbia on Early Harvest, June 16 and 20, respectively.

Blister canker caused by Nummularia discreta

- Ohio: (Selby, July 1) Has shown increased attack on older apple trees, especially to the southward in Ohio. The early removal of the infected branches, certainly before the sprays applied at time of swelling of buds, is properly insisted upon.
- Tennessee: (Hesler, July 1) Scattering cases found in various parts of the state. Observed on Paragon, Ben Davis, Delicious and Father Abraham.

Fruit spot caused by Phoma pomi

Delaware: (Manns, July 15) The apple spot, Phoma pomi, has marked some of the earlier varieties, from which the last scab spray was omitted.

New York: (Chupp, July 1) Reported three times from the Hudson Valley. The first new specimens for the season sent in June 19, from La Grangeville, Dutchess County.

Anthraco nose caused by Neofabraea malicorticis

Oregon: (Barss, July 1) Reports indicate great severity and general distribution of this disease throughout western Oregon. The severe freeze of last December rendered bark tissues subject to a spread of infections at a rate often many times greater than usual. Big crop and scarce labor last fall resulted in great delay or even abandonment of fall anthracnose spray with consequent rapid increase in number of infections.

Powdery mildew caused by Podosphaera leucotricha

New York: (Chupp, July 1) Has been reported from Ontario and Monroe Counties. Earliest report, Lincoln Park, Monroe County, June 18.

Oregon: (Barss, July 1) General as usual throughout state. Kept pretty well under control by usual lime-sulphur scab sprays.

Root rot caused by Xylaria and Armillaria

New York: (Chupp, July 1) According to the reports of field assistants this trouble is becoming more serious each season. It has already been reported thirteen times from five counties. The first report was sent in April 26, from Genesee County.

Crown gall caused by Bacterium tumefaciens

Tennessee: (Hesler, July 1) The aerial form of this disease has been found generally over the state. In most cases not serious, although in some instances a considerable amount of damage is undoubtedly resulting. In a few cases trees recently killed in bearing orchards showed crown gall on the roots. The disease is common in nurseries.

PEACH

Leaf curl caused by Exoascus doformans

Leaf curl was especially abundant this spring in some of the Middle Atlantic and Ohio Valley States. A cool, wet spring during bud opening doubtless favored the disease and also in some cases made it difficult to apply the

dormant spray on time. In central and northern New Jersey, Connecticut, and New York very little of the disease was evident, however.

Massachusetts: (Osmun, July 1) In most years this disease is reported more frequently than any other. Not a single report has come to this office the present season. We are inclined to believe, however, that the disease is present, as usual, and that failure of growers to report it is due to there being no crop this year.

(July 15) Since our last report we have learned that leaf curl is more prevalent than usual the present year. This may be attributed, in part at least, to the fact that many growers failed to apply the dormant spray for this disease because most of the fruit buds were winter-killed and, as a consequence, there has been a tendency to neglect the peach orchards. Weather conditions also seem to have favored development of the disease.

Connecticut: (Clinton, July 1) Practically none. Two specimens sent in for identification.

New York: (Chupp, July 1) Every commercial orchard sprayed during late autumn or early spring. Control is almost perfect. Leaf curl is severe on the trees that were not sprayed. These trees, however, are found only singly in gardens, or in small orchards, and do not constitute any appreciable percentage of the crop.

New Jersey: (Haskell, July 1) Curl occurred rather seriously in at least one commercial orchard near Bridgeton. This orchard was not sprayed on time. The disease was rather common on certain unsprayed, door-yard trees in southern parts of the state, but most of the orchards were sprayed and did not show much curl. Orchards at Beverly in the western part of New Jersey were inspected and no trace of the disease could be found even in some unsprayed orchards.

Delaware: (Manns, July 15) Very severe in unsprayed orchards. Quite severe in orchards not thoroughly sprayed.

Delaware and East Shore of Maryland: (J. W. Roberts, June 2) Most orchards sprayed too late or not at all. Those sprayed in time almost free from leaf curl and have good crop. Estimate of 75% damage to this year's crop is probably too low.

Maryland: (Temple, July 15) As prevalent as in 1919 even where dormant spraying was done. This makes two years in succession of as much infection as I have ever seen.

Virginia: (Fromme, July 15) Very severe in unsprayed orchards in all parts of the state. Commercial orchards affected in varying amounts according to kind of spraying. First record May 12. Reported from following counties: Albemarle, Rockingham, Bedford, Clarke, Scott and Fauquier.

Georgia: (McClintock, July 1) Abundant this spring on various named varieties, and on seedlings. I do not believe leaf curl was as serious this spring as it was a year ago in Georgia.

Alabama: (Thiel, July 1) Very severe in the northern part of the state. Inquiries in regard to this disease were received from several counties.

Mississippi: (Neal, July 1) Leaf curl has been reported by Snapp of the Bureau of Entomology from Union County, as being more prevalent than usual this season. The disease is also present on several of the early varieties of peaches here in the horticultural experiment orchard.

Texas: (Taubenhaus, July 1) No report. Unimportant this year.

- Oklahoma: (Learn, July 15) This trouble has not been reported thus far this year, but in my visits about here I noticed it quite abundant in several orchards. It has not been severe enough to attract the attention of the grower.
- Ohio: (Selby, July 1) Seems to be unusually prevalent this season. Scarcely an orchard is free from the disease. It is especially bad in orchards where the dormant spray has not been applied. No serious loss by virtue of the defoliation of the trees has come to our notice, yet no section of the state seems to be free from invasions of the fungus.
- Illinois: (Anderson, May 21) Peach leaf curl appeared about two weeks ago near Bloomington, and is also present in Richland County. It seems to be quite severe this year.
(July 1) Very serious in unsprayed orchards throughout the state. Especially destructive in central Illinois. Present, but not serious in orchards which received dormant sprays this season. In one orchard where Elberta and Champion were grown next to each other the Champion was severely attacked while little curl was seen on the Elbertas. This orchard was not sprayed. Cold, rainy period throughout state this spring was probably the cause of unusual outbreak.
- Michigan: (Coons, July 1) Reported general spraying in peach district this year. Fifty per cent loss according to County Agent Simonton of Union County, on unsprayed trees.

Brown rot caused by Sclerotinia cinerea

The blossom and twig blight forms of brown rot were severe this year in New Jersey, Delaware, and Maryland, so that there is an abundance of the fungus active and ready to infect the fruit if it approaches maturity under wet and warm weather conditions. There was considerable brown rot in the Georgia peach crop this year, as usual, and many complaints of decay in transit have been made.

- Massachusetts: (Osmun, July 1) Little damage from brown rot has been reported. This is due largely to the fact that practically the entire crop was destroyed by winter injury of the buds.
- Connecticut: (Clinton, July 1) Practically no peaches except few along the shore. Occasional light infections on fruit spurs and small twigs, more evident on weakened trees.
- New York: (Chupp, July 1) There was a slight amount of blossom blight, and a number of cankers from last year's epidemic. It is too early to determine the amount of damage on the fruit.
- New Jersey: (Haskell, July 1) Blossom blight serious in southern part of state. Many orchards show 20-30% blossoms killed with small cankers developing on twigs at point of attachment. A little rot of green fruit evident June 25-28, but not doing much damage except for providing future sources of infection.
- Delaware: (Manns, July 15) Blossom infection quite severe, and season has been so wet, many cankers and lesions producing abundance of conidial spores. Much fruit brown rotting by infection through curculio stings. Very large amount of cankers from blossom blight and possible chance for large losses if weather is wet during ripening.
- Maryland: (Temple, July 15) In one large orchard 25% of the blossoms were killed by blossom blight and in many other orchards this disease destroyed a large percentage of the blossoms, young fruits, and twigs. Just now (July 7) the fruit infection is not as prevalent as usual at this time of year.

- Georgia: (McClintock, July 1) Brown rot is present wherever fruit is not sprayed, but the dry weather appears to be holding it in check. Have observed it on a number of varieties of peaches and plums.
- Mississippi: (Neal, July 1) The disease is present in many orchards in the state, but where thorough spraying has been timely the disease is not serious.
- Alabama: (Thiel, July 1) Present in various sections of the state.
- Ohio: (R. C. Thomas, July 1) In cases where brown rot is found to occur at this season it is to be noted that sanitary precautions and the removal of mummies, both on the trees and in the debris underneath, have not been carefully observed. The early appearance of the disease in such sections gives abundant promise that very severe attacks may well be expected as the ripening period approaches. The weather conditions have favored the liberation of the ascospores in all sections of Ohio.
- Illinois: (Anderson, July 1) Caused some blossom blight early in season. Has not yet appeared on the fruit.
- Michigan: (Coons, July 1) Not seen so far.

Black spot caused by Bacterium pruni

- New Jersey: (Haskell, July 1) Observed in orchards in South Jersey particularly at Vineland and Hammonton. In the latter peach growing center it is one of their serious problems. Many leaves were affected and were beginning to fall June 28. In the western part of the state about Beverly and Riverton not much of this disease was seen except on a few neglected trees.
- Connecticut: (Clinton, July 1) Observed to be more or less common on weakened trees; healthy, vigorous trees do not seem to be infected.
- New York: (Chupp, July 1) This disease has been reported, but is evidently rare in the state. Some trees in a weakened condition are reported as being affected.
- Delaware: (Manns, July 15) Disease becoming more severe each year. Many trees defoliated, and cambium severely injured by infection. Many trees killed outright.
- Maryland: (Temple, July 15) Distribution localized; leaf lesions beginning to show.
- Virginia: (Fromme, July 15) More complaints this year than ever before. Injury from cold spring seemed to have intensified the trouble. On leaves only, none seen on fruits.
- Georgia: (McClintock, July 1) None observed.
- Alabama: (Thiel, July 1) Inquiries received from several counties. Not serious.
- Mississippi: (Neal, July 1) This disease is quite general throughout the state, causing considerable damage, especially in orchards which have not received adequate cultivation and fertilization. One orchard in Lauderdale County, the disease is reported as being very severe, the infection running as high as 25%.
- Ohio: (R. C. Thomas, July 1) Only one case has been reported. The infection undoubtedly spread from infected plum trees of the Japanese variety in the near vicinity. We have no reason to believe that black spot is more abundant this season than last, as noted at the present time.

Illinois: (Anderson, July 1) Serious on trees where poor growth was made due to lack of cultivation or other causes. Serious defoliation in some orchards in southern Illinois. Not bad in well cared for orchards. Has not been observed on the fruit.

Scab caused by Cladosporium carpophilum

Delaware: (Manns, July 15) Quite severe.

Virginia: (Fromme, July 15) Very slight. There seems to be practically no scab in commercial orchards. Only a little seen on unsprayed trees.

Georgia: (J. W. Roberts) Noted June 5. General on unsprayed fruit of all varieties.

Alabama: (Thiel, July 1) Prevalent throughout the state.

Mississippi: (Neal, July 1) Reported from one orchard in Union County, but not serious. Also observed on the early varieties here in the horticultural orchards.

Illinois: (Anderson, July 1) Noted especially on the twigs causing numerous small lesions on last season's growth and appearing now (June 28) on new growth.

STRAWBERRY

Leaf spot caused by Mycosphaerella fragariae

Mycosphaerella leaf spot is reported from New Hampshire, Vermont, Massachusetts, Connecticut, New York, New Jersey, Delaware, Maryland, Ohio, Illinois, Michigan, Wisconsin, Alabama, Mississippi, Louisiana, Texas and Oregon. In most states even where it is prevalent, the disease is said not to be doing any particular damage. However, in New York, Illinois, where it is said to be more serious than usual, and Mississippi, it is apparently causing considerable loss in some cases. In Massachusetts also a case was observed of early occurrence of leaf spot, materially reducing the yield in one large bed.

Connecticut: (Clinton, July 1) Causing considerable loss on Glen Mary by attacking fruit stems.

New York: (Chupp, July 1) Is very common all over the state and in some plantings, it has been reported, a large percentage of the crop has been lost due to leaf and pedicel infection.

Maryland: (Temple, July 1) The most susceptible varieties are being eliminated from the plantings in Maryland.

Mississippi: (Neal, July 1) Reported as causing serious loss in Neshoba County in small plantings. Disease is common here at the horticultural gardens, but not serious.

Illinois: (Anderson, July 1) More serious than usual this season due to early seasonal conditions (cold, rainy). William Belt variety especially susceptible.

Gray mold rot caused by Botrytis sp.

Gray mold rot is reported from Massachusetts, Connecticut, New Jersey, Ohio, Indiana, Illinois, Michigan (occasional in Ingham County, no loss), Alabama (at Auburn), Louisiana, Texas and California. Wet weather favored its development in Massachusetts, Ohio and California. In Indiana and Illinois it does not seem to be more prevalent than usual.

Market reports show the presence of Botrytis rot in shipments of strawberries from Florida (4 cars), Alabama (5 cars), and Louisiana (5 cars). The decay in these shipments ranged from very little to almost complete, and was heaviest in those from Florida.

The accompanying report of conditions in California by Dr. Neil Stevens is of interest.

Connecticut: (Clinton, July 1) On certain varieties, as Premier, in early part of season, but drier weather has prevailed recently and there is little evidence of it at the present time.

Wisconsin: (Vaughan, July 1) Present, but not destructive. There has been little excess moisture to stimulate rot.

California: (N. E. Stevens, data applies only to January, February and March, 1920). As a result of three months' study of strawberries in Los Angeles County, California, I am able to report an abundance of Botrytis which surpasses even what I reported from Northern New England. In January, which is not usually considered a part of the fruiting season, from 25-37% of the berries in the fields showed Botrytis fruiting. During March, when the berries were being regularly picked and marketed, often more than half the berries in a box would develop Botrytis. Rhizopus species and Fusarium species are present of course, but at this season at least Botrytis dominates everything.

I am inclined to attribute this superabundance of Botrytis to the very large proportion of cold weather, that is weather too cold for most fungi, but fairly favorable to Botrytis. I am now at work on curves of hourly temperatures and it is evident that during these months a large number of hours show temperatures of the kind mentioned. This or some other favorable conditions make Botrytis very common during even very dry weather.

Rot caused by Rhizopus sp.

Rhizopus rot is reported as occurring in the field as follows:

New Jersey: (Cook, July 1) Abundant.

Maryland: (Temple, July 1) Rot caused great loss during the latter half of the ripening season.

Louisiana: (Edgerton, July 1) Present, but have no data on loss.

Illinois: (Anderson, July 1) Not as abundant as during previous seasons. Noticed on Mississippi berries in market.

South Dakota: (Michel, July 1) This disease has been very prevalent and destructive in the vicinity of Brookings. On the horticultural plots a large per cent of the fruits rotted due to especially favorable weather conditions.

This rot was found by Bureau of Markets inspectors in strawberries shipped from Florida (9 cars), Alabama (10 cars), and Louisiana (32 cars). The decay was worst in the Florida shipments.

Leaf blight caused by Phoma (Dendrophoma) obscurans is reported by H. W. Anderson of Illinois as - "Not as prevalent this season as last. Observed in southern Illinois (Anna) causing some blighting of older leaves".

Nematode caused by Tylenchus dipsaci - Severe attacks reported from the coast section of Lane County, Oregon, according to H. P. Barss, July 1.

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UNITED STATES DEPARTMENT OF AGRICULTURE

THE PLANT DISEASE BULLETIN

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Vol. IV

Number 2

POTATO WART SURVEY

The search for new occurrences of potato wart has commenced again this year and already a new location for the disease has been found. The party of men in charge of Mr. W. L. Garis, working out from Saxton, Pennsylvania discovered wart in Woodvale, Huntingdon County, July 28. This town is about fifteen miles southeast from Saxton and is in the heart of a mining region. It is about thirty-five miles from any other place where wart is known to occur. We have been notified of only one infested garden but in this the disease was prevalent in all parts. The soil has apparently been infested for some time as the same seed planted in other gardens showed none of the disease. This report of occurrence has been checked by specimens, and the quarantine officials at Washington and at Harrisburg, Pennsylvania have been notified.

At the present time (July 31) there is a party of five men working in Pennsylvania. Professor A. A. Farnham is advance agent for the group and precedes the main party, making the necessary preliminary contacts, and provides a certain amount of publicity so that when the survey men arrive they can commence work immediately, and can proceed with fewer difficulties. The scouting party in Pennsylvania includes W. L. Garis, leader, J. C. Dunegan, A. L. Mitke, and Michael Skweir. In West Virginia a similar group of men are working.

Dr. A. F. Hemenway is advance agent and Professor H. S. Stahl, leader. W. W. George, J. E. Haifleigh, A. W. Harman, and J. H. Mullen constitute the rest of the party.

All the men are doing intensive survey work reaching out from the known areas of infestation in an ever widening circle. By the end of this season the present known areas should be quite well delimited and a considerable amount of ground outside of these covered.

In addition to the intensive work in West Virginia and Pennsylvania, the Federal Horticultural Board desires a large number of gardens inspected in certain other suspicious and somewhat comparable places. The services of the following men have been secured to do intensive work outside of Pennsylvania and West Virginia: Dr. L. R. Hesler, Professor H. C. Young, Mr. George Haines, and Dr. G. W. Martin. It is planned to inspect gardens on the outskirts of New York City and also in certain other towns and villages in New York State. Places where the foreign population is rather heavy will also be visited in Connecticut and Massachusetts, and certain fishing villages on the coast north of Boston will need examination. A few representative coal mining regions in Maryland, Ohio, Indiana and Illinois will probably be visited by some of these men.

VEGETABLES AND FIELD CROPS

BEAN

Bacterial blight caused by Bacterium phaseoli

Reports of the occurrence of bacterial blight were received July 1 from New Jersey (on seedlings), Virginia (slight at Blacksburg), Wisconsin, Kentucky, Tennessee, Mississippi, Louisiana, Texas and Arkansas. These reports indicate that while the disease is common in most states, it is not severe except in a few fields. Louisiana reported the loss due to blight as probably less than usual.

Kentucky: (Valleau, July 1) Present in most gardens but causing very little damage as it is not spreading.

Tennessee: (Hesler, July 1) General in state. One field heavily injured at Jackson, western Tennessee. Chiefly leaf infection with slight amount on pods.

Mississippi: (Neal, July 1) Common throughout the state, but only in a very few instances has it been found or reported to cause appreciable loss.

Anthracnose caused by Colletotrichum lindemuthianum

Anthracnose was reported July 1 from New Hampshire, Virginia (slight at Blacksburg), Alabama, Mississippi, Louisiana, Texas, Arkansas and Wisconsin. Infected beans said to have come from Florida were found on the market in Knoxville, Tennessee.

Except in New Hampshire, where it is said to be doing considerable damage in some counties, the disease, although common, does not seem to be serious as yet.

Mississippi: (Neal, July 1) Anthracnose infection was observed at Crystal Springs, Hazelhurst, and also in hampers at depot at Jackson, during May. The infection in the field at either place was not over 1-2%. All of the infection observed was on the wax varieties; the green beans being free of the disease.

Mosaic (cause undetermined)

Virginia: (Fromme, July 1) Slight at Blacksburg on garden beans, also on English broad bean.

Tennessee: (Hesler, July 1) Moderate cases observed at Humboldt in western part of state June 15, and traces noted at Knoxville (eastern Tennessee).

Georgia: (McClintock, July 1) Small per cent observed on string or snap beans to date, but none seen on pole beans as yet this season.

Michigan: (Coons, July 1) Not seen in field beans as yet. Case of 26% infestation in a garden patch of wax beans seen at Kalamazoo.

Mississippi: (Neal, July 1) This disease is present in many localities in the state. I observed many fields at Crystal Springs affected with

the disease, some fields appeared to have fully 10-12% of the plants infected. I have also observed the disease in the gardens around Starkville. Appears to be worse on wax varieties.

Louisiana: (Edgerton, July 15) Very common, even in fields producing a satisfactory crop. No way of estimating loss.

Arkansas: (Elliott, July 1) Common.

Wisconsin: (Vaughan, July 15) Small amount seen. Little if any damage.

Oregon: (Barss, July 1) Incomplete observations indicate the occurrence of this disease in high percentages in many fields in the vicinity of Corvallis. Further survey is expected to establish its widespread occurrence.

Rust caused by Uromyces appendiculatus

Rust was reported from Texas and Arkansas as unimportant, and from Louisiana and New Mexico as follows:

Louisiana: (Edgerton, July 15) Common on some varieties. This disease is usually the most troublesome in the summer months on the pole varieties.

New Mexico: (Leonian, July 1) Abundant in southeastern part of the state. Other sections comparatively free from it.

Stem rot caused by various organisms

Stem rot is reported from New Jersey, Kentucky, Louisiana, Texas and Michigan. In no case is it said to be important. In New Jersey the cause has been given as Rhizoctonia, and in Texas as Sclerotium rolfsii.

Diaporthe phaseolorum (leaf spot stage) is reported as very abundant on lima beans in the southern part of New Jersey.

CABBAGE

Yellows caused by Fusarium conglutinans

Yellows was reported July 1 as present, apparently in the normal amounts, in Delaware, Maryland, Virginia, Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma (one report) and Arkansas. According to the Weekly Crop Notes of the Bureau of Crop Estimates the disease is causing some damage to the cabbage crop in the Muscatine district in Iowa (July 8).

Delaware: (Manns, July 1) Specimens brought in today (June 24). Quite severe in some fields, 10% dying.

Virginia: (Fromme, July 1) Moderate to severe in fields near Marion, Smyth County.

Kentucky: (Valleau, July 1) Reported from Hopkinsville and Farmington, causing considerable losses in small plantings. Observed in Louisville.

District causing loss of 30-75% in early cabbage. It is apparently the most serious cabbage disease at present.

Tennessee: (Hesler, July 1) Definite in Henderson, Scott and Davidson Counties. Probably not generally serious this year.

Alabama: (Thiel, July 1) In small amounts in nearly every field in the Mobile section.

Mississippi: (Neal, July 1) Yellows appears to be rather general around the Crystal Springs section, but apparently causing as yet but little loss.

Louisiana: (Edgerton, July 15) Very common. Loss heavy the past season.

Arkansas: (Elliott, July 1) Common and severe.

Black leg caused by Phoma lingam

Black leg was reported July 1 from New Jersey (on seedlings), Maryland, Georgia, Alabama, Mississippi, Louisiana and Arkansas. Judging from the reports at hand it apparently is causing little damage on cabbage except in Maryland, Alabama and Arkansas.

Georgia: (McClintock, July 1) Not observed to any great extent on cabbage, but serious in collards grown for seed. 75% of the plants were killed during the season, due to Phoma attacks on the stem. Suspected of being seed carried by collards.

Alabama: (Thiel, July 1) Very prevalent and serious in the vicinity of Mobile. Present in nearly every section of the state.

Mississippi: (Neal, July 1) The disease does not seem to be so prevalent as last year, and only a few fields were found with it in the vicinity of Crystal Springs this season.

Black rot caused by Bacterium campestris

Black rot is said to be unimportant in New Jersey and Texas, and to be causing some damage in parts of Alabama and Mississippi, as shown in the following reports:

Alabama: (Thiel, July 1) Very serious in the Mobile section. From 5-25% of the plants in several fields in Mobile County were affected.

Mississippi: (Neal, July 1) Black-rot was observed in many fields at Crystal Springs, Utica, Hazelhurst, and Gulfport the latter part of May and June. In some fields the infection ranged from 2-5%, and one field near Crystal Springs was observed which had as high as 10% black-rot infection.

Black leaf spot caused by Alternaria brassicae

Black leaf spot was reported July 1 only from Mississippi, where a few fields in the vicinity of Crystal Springs were infected from 2-3%. G. K. h. Link reported in March that dry weather restricted the appearance of Alternaria in the Colma and Watsonville sections of California.

Ring spot caused by Mycosphaerella brassicicola

Ring spot was reported in March by G. K. K. Link from the Colma district of California, as follows:

"The excessively dry weather has practically kept ring spot of cabbage, brussels sprouts, and cauliflower in check in the early crop of the Colma district. The younger plants, however, show a very considerable infection with consequent yellowing and death of the leaves, and therefore may produce small heads of poor shipping quality even though rains should set in. Ring spot seems to be restricted to the northern sections of the state. It has not been reported south of the Colma district."

Rot caused by Sclerotinia libertiana

Rot was reported (March) from California by G. K. K. Link. It was said to have been found in all trucking districts of the state except those of the Coachella and Imperial Valleys. The heavy fogs prevailing in those sections and the cool weather of the winter and spring months are especially favorable to the disease.

Slimy soft rot caused by Facillus carotovorus

Slimy soft rot was abundant and caused considerable loss in the field in Louisiana (July 15). It was present in shipments from Alabama, affecting from 50-75% of the contents of several cars.

Black leaf speck was reported by G. K. K. Link as present in California in practically all sections visited where the variety Winningstadt was grown. (March)

Malnutrition. Unfavorable soil conditions, improper cultural methods, and unfavorable weather were largely responsible for the general poor conditions of cabbage in California, according to a report of G. K. K. Link. (March)

CELERY

Late blight caused by Septoria petroselinii apii

Late blight was reported from California in March by G. K. K. Link as follows:

"Celery in the Sacramento, Watsonville, and El Monte districts was severely affected with late blight. Most of the fields in the El Monte section are badly stunted and yellow. This condition is supposed to be due to 'cold weather' and 'frosts'. In most fields severe petiole lesions were found and numerous plants were found in the field that were going down with slimy soft rot following late blight. Spraying is practised in the El Monte district, but if it is not done more intelligently very soon the El Monte celery industry will become a thing of the past. Spraying is begun too late and too much reliance is put in the plants 'growing away from it' (the blight). Seed beds

are prepared in fields from which blighted celery was harvested, in fact, I noted a seed bed full of trash of the blighted celery crop harvested a week or so previous to the preparation of the seed bed. It is not surprising therefore that some California celery arrives in the market badly blighted and slimy".

Foot rot caused by Sclerotinia libertiana

Foot rot was reported by I. C. Jagger in February as occurring in practically all fields in the vicinity of Sanford, Florida. The disease was also reported from California (March) by G. K. K. Link, in the Sacramento, Watsonville, and El Monte districts. At the latter places it was particularly prevalent, in some fields affecting 25% of the plants, and causing a typical drop. The disease is favored by the cool weather and heavy fogs prevailing in those sections and also by the dirt bank method of blanching used.

Watery soft rot caused by Sclerotinia libertiana was prevalent and often quite destructive in celery shipped from New York (2 cars), Florida (90 cars), Michigan (1 car), and California (37 cars).

Gray mold rot caused by Botrytis sp. was reported by G. K. K. Link in March from California as common in most of the trucking sections visited.

LETTUCE

Downy mildew caused by Bremia lactucae

Downy mildew was common and favored by weather conditions in most of the trucking sections of California, according to G. K. K. Link (March). It is said to be responsible for most of the transit troubles in lettuce shipped from Los Angeles and points north.

Inspectors of the Bureau of Markets have found downy mildew in 19 cars of lettuce shipped from California this year. In most cars from 50-100% of the heads showed decay, which was bad in some cases, although usually only the outer leaves were so affected.

Watery soft rot caused by Sclerotinia libertiana

Watery soft rot was serious in February in the vicinity of Sanford, Florida, according to I. C. Jagger. It was also reported by G. K. K. Link in March from California, where it was common in the fields in most of the trucking districts.

The disease has been reported in shipments of lettuce from several states, as follows: South Carolina, one car with considerable decay; Florida, 15 cars, decay slight to severe; Minnesota, one car, decay considerable; Texas, 8 cars, decay slight to severe; Arizona, 6 cars, decay considerable; California, 29 cars, decay slight to severe.

Gray mold rot caused by Botrytis sp. was reported from California by G. K. A. Link in March. The disease was common in most of the trucking sections visited. At Watsonville three fields were observed in which 20% of the plants were affected.

GREEN PEAS

The greatest loss to Maryland pea canners this year according to C. E. Temple has been due to seed of mixed varieties. The seed in a number of cases was bought for good Alaska stock but whole fields will average four feet to six feet in height with few or no peas produced. In every case investigated the seed is supposed to have come from Washington and Idaho. If any other person has further information on this subject Professor Temple and the Plant Disease Survey would be glad to receive it.

Root rot, probably caused by Fusarium, Pythium, and possibly other organisms.

Root rot is common again this year in the tri-state area including New Jersey, Delaware, and Maryland. Reports would indicate, however, that it was not nearly so severe as last year when peas were very severely injured. The pea crop in Delaware is said to be the largest in the last six to eight years. In Connecticut root rot is extremely serious this year. This is the first season the disease has been noticed to any great extent. It is very prevalent, being present in practically every patch of peas about New Haven, and is reducing the yield one-half or more. The plants became yellow at about the time when the pods were filling and when pulled showed a decayed root system and darkened lower stem.

The following state reports have been received:

New Jersey: (Cook, July 1) Abundant.

Delaware: (Le Cato, May 14) Found first fields with pea root rot yesterday.

(Lanns, July 1) Specimens with Pythium brought in by Dr. F. K.

Jones. Pea crop largest in years.

Maryland: (Temple, July 1) Fusarium associated with Pythium present in almost all fields. Most prevalent in fields planted to peas several years in succession. In some cases as much as 50% of the crop is lost through this trouble.

Virginia: (Fromme, July 1) About 5% of plants in gardens at Blacksburg affected.

Blight caused by Ascochyta pisi

Blight has been reported from Massachusetts, Delaware and Maryland. In the latter state it was observed causing a considerable loss in a few fields.

Spot caused by Septoria pisi is reported from Delaware and Maryland but is not causing much of any loss.

POTATO

Late blight caused by Phytophthora infestans

Late blight has been reported to the Survey this year from Florida, Alabama, South Carolina, West Virginia, New York and Wisconsin. Recent information to show how badly the Florida crop was affected is not at hand but it is thought to have been somewhat subnormal this year. It was first reported March 22 in Florida. Mr. Shapovalov reported the disease as rather prevalent in the Charlestown, South Carolina section in early June. The occurrence in New York was at Orient, Long Island and was noted by F. C. Meier early in July. The disease in West Virginia was reported on by Anthony Berg as follows:

"It may perhaps be of interest to you to know that I have located a potato field near Winfield, West Virginia, infected with late blight. The disease was already well established on June 27."

In Wisconsin, J. W. Brann has just reported finding a slight infection on Green Mountains in Oneida County, June 25.

Mosaic (cause unknown)

Alabama: (Thiel, July 1) Very common in Mobile County. From 50-90% of the plants in six different fields in Mobile County were affected. This seed was received from certified stock of Wisconsin. Fields which showed a heavy infection in May recovered considerably and the loss due to this disease was negligible. Triumph variety was always heavily diseased.

Georgia: (McClintock, July 1) Observed on Triumph and Green Mountain, but causing most serious losses on the former. None observed on Cobbler, Early Rose, or Early Ohio growing in the same field with the above.

Leaf trouble caused by a number of factors.

New York: (News Notes of the Office of Cotton, Truck and Forage Crop Disease Investigations, July 24) Mr. M. Shapovalov returned on July 13 from a short trip to Riverhead, L. I., to investigate a potato leaf trouble reported there. The condition was not found to be as serious as reported but was of considerable interest. The symptoms of the trouble were found to be, first a bronzing, then irregular spotting, and finally complete death of the leaves. A careful inspection led to the belief that it was caused by lack of nitrogen, coupled with mosaic and aggravated by insects and early blight.

Fusarium wilt caused by Fusarium oxysporum

Fusarium wilt is reported from Colorado by H. G. Macmillan (July 10), as follows:

"Potato seed piece rot (Fusarium) has been delayed somewhat but is coming on now. With the plants as well established as they are I do not look

for any epidemic of blight (*Fusarium*) this year. In fact, the crop looks better, even though it is late, than I ever saw it before at this time of the year. In the dry lands, where some seed stock is being propagated for the irrigated district, the potatoes are not so well along."

TOMATO

Leaf spot caused by Septoria lycopersici

It is rather early for reports of this disease, but it has been observed in a number of the southern states including Georgia, Mississippi, and Missouri. Prof. D. C. Neal, of the Mississippi Experiment Station, reported having observed slight damage in the vicinity of Crystal Springs and in Lauderdale County.

Fusarium wilt caused by Fusarium lycopersici

This wilt is prevalent as usual and is doing a great deal of damage at the present time in some of the more southern tomato states. The following reports from Georgia, Alabama, and Mississippi indicate the situation more clearly:

Georgia: (McClintock, July 15) Has already killed 10-25% of the tomatoes from commercial seed planted in various sections of the state. Resistant selections are holding up well to date, two pickings having been made.

Alabama: (Thiel, July 15) Inquiries indicate the disease quite common throughout the state.

Mississippi: (Neal, July 15) With the exception of blossom-end rot this disease is responsible for greater tomato losses than all the others combined. It is prevalent again this year all over the state. The wilt resistant strains sent out by the Office of Cotton and Truck Disease Investigations have been found to be effective in controlling the disease in many instances, but commercial growers are still employing susceptible varieties.

Early blight and nailhead spot caused by Macrosporium solani

This disease was common again in Florida, and the report from Mississippi indicates that it was prevalent as usual, but the losses were not sufficient to warrant spraying.

McClintock in Georgia states that on July 15 the disease had not come to his attention, and Thiel in Alabama says that only a few reports have been received from different sections of the state.

On tomatoes shipped from Florida during the spring and early summer nailhead spot was very common, being found in greater or less quantities in many cars. It was also found in a car of Arizona tomatoes, affecting from 5-6% of the fruit; in one car of Texas tomatoes spotting 2% of the fruit; and in 4 cars of Mexican tomatoes injuring 3-5%, 4-6%, 8-10%, and 8-10% respectively.

The abundance of spot in Florida tomatoes is worthy of attention and is hence presented in more detail in the following table:

Table I. Percentages of nailhead spot found in carloads of Florida tomatoes shipped to northern markets from February to May, 1920.

Date	Markets	Number of cars	Percentage affected tomatoes
Feb. 14	Pittsburgh	1	8-10
" 24	Pittsburgh	1	6
" 25 - Mar. 2	Pittsburgh, Fort. Worth, Cleveland:	3	5-7
			17
			5-8
Mar. 2-25	New Orleans, Pittsburgh, Chicago	9	2-3
			18
			3-5
			6-8
			8-10
			6-8
			10-35
			12-15
			15-18
Mar. 4-6.	Pittsburgh	1	8-10
Mar. 4-27	Baltimore, Chicago, Pittsburgh	7	5
			13
			8
			2
			10-12
			12-15
			6-8
Mar. 9-18	New York, Boston, Chicago	4	5
			2
			8-10
			18
Mar. 9-25	Pittsburgh, Philadelphia, Boston	7	8-10
	New York		30
			3
			3-10
			5
			3
			5
Mar. 11-15	Philadelphia, Pittsburgh	3	10
			3
			14-16
Mar. 16-25	Boston, New Orleans, Pittsburgh,	7	3
	Chicago, Cleveland		10
			3-4
			8
			8-10
			3-5
			5-6
Mar. 19-27	Philadelphia, Cleveland, Kansas	3	10
	City		12-15
			30

Date	Markets	Number of cars	Percentage affected tomatoes
Mar. 20-23	Washington, Cleveland, Cincinnati	3	5-10 10-12
Mar. 22 - Apr. 1	Pittsburgh	3	t 1 2 8-10
Mar. 25 - Apr. 1	Chicago, Pittsburgh	4	20-25 12-15 10-15
Mar. 30-31	Washington	2	5 2 2
Mar. 31	Chicago	1	6-8
Apr. 6-8	Cincinnati, Detroit	3	8-10 4-6 2-3
Apr. 8	Chicago	1	10-15
Apr. 19-22	Cincinnati, Washington	7	18-20 10-12 4-6 10-12 15-17 2 18-20
Apr. 22-27	New Orleans, Pittsburgh, St. Louis	5	4-6 10-20 2 10-12 10-12
Apr. 29 - May 5	Washington, New Orleans	3	90 25 25-50
May 7	Philadelphia	1	35-60
May 13-15	Detroit, Philadelphia, New Orleans	5	10-15 40 30-35 10 20
May 15-19	Boston, Cleveland, Pittsburgh	6	20 4 25-65 15 25
May 20-26	Detroit, Chicago	2	50-65 8-10 5-10

Bacterial blight caused by Bacterium solanacearum.

Reports from Alabama, Georgia, Mississippi indicate this disease to be of comparatively little consequence this year. At least only a very few reports of the disease have been received in these states.

Phoma rot caused by Phoma destructiva.

This fruit rot has been reported to the Plant Disease Survey this year only by the market inspection service of the Bureau of Markets. Inspectors engaged in examining carlot shipments of tomatoes in some of the larger city markets have reported finding this disease this season in fruit shipped from Arizona, California, Florida, Texas, Cuba, and Mexico. The disease was found most frequently in shipments from Florida and Mexico. In cars from the other states the disease occurred in the following percentages: Arizona (2 cars, 1 and 4%), California (3 cars, 3-5%, 5-10%, and 15-18%), Texas (1 car, 22%, including slight Rhizopus rots as well as Phoma), Cuba (7 cars, 8-10%, 7-9%, 6%, 3-5%, 35-40%, 14%, and 10-15%). In a few cases it is mentioned that the Phoma rot is associated with decay caused by Rhizopus.

As the disease is a very important one in Florida tomatoes the percentages of decay found are presented in some detail in the following table. In many cases this rot was associated with soil rot caused by Rhizoctonia and soft rot caused by Rhizopus. Because of this it is very difficult for market inspectors to say definitely how much of the decay was due to the various causes.

Table 2. Percentage of Phoma rot of tomatoes by months as found by inspectors of the Bureau of Markets in carlots examined at larger city markets January 22 to June 14, 1920. (In some cases the rot was associated with other rots, particularly those caused by Rhizopus and Rhizoctonia. This is indicated in the table where such was the case.)

Percentages in					
January	February	March	April	May	June
35	4	10	8	15	15(P+R+ (F+Ba)
35	20-30	2(P+R)	3	9	9
8	35-40	5-10(P+R)	25	34	30-35(P+S+ F)
2-3	30	2-3(P+R+ S)	12	5-50	20-25(P+F+ Ba)
5-6	10(P+R)		20	15	
15(P+S)	t	2	15-20	7	
	12	2	18-22	20-35(P+S+ Ba)	
	27-30	3-5	15	BLE)	
	6	4	35	3(P+S)	
	10	18-20	30-60	10(P+R+ Bu)	
	5-7	25-30	20-50	20(P+R+ F)	
	10-15	28-30	10-12		
	10-12	5-7	5-15(P+R)		
	5-10	30-35	20-30(P+R)	6-7	
	5	5	10-20(P+R)	7	
	3	20-25	14-18(P+R)	10	
	16-18(P+R)	10	27	12	

Percentages in

February	:	-	March	-	:	April	:	May
10	:	5	:	10	:	12-15(P+S+R)	:	15-25(P+A+R): 12-30
14(P+S)	:	3	:	8	:	18	:	25-40
15-25	:	10-20	:	5-8	:	6	:	20-40(P+A+R): 7-13(P+S)
3-5	:	25	:	5	:	20-25	:	10-12(P+F+Ba)
55	:	3	:	10	:	25-35	:	25-50(P+A+R):
5-10	:	30(P+R)	:	20-25	:	2-15	:	30
10-12	:	25-35	:	20-25	:	5	:	12-15
4	:	20	:	18-20	:	40	:	5
2-4	:	2(P+S)	:	25-30	:	20-25	:	10
5	:	10-20(P+S)	:	5	:	8	:	2-3
	:	10(P+S)	:	20	:	5	:	25
	:	3-6(P+S)	:	30	:	5	:	5-8
	:	12(P+S)	:	50	:	10	:	40
	:	6-8(P+S)	:	24	:	6-10	:	10
	:	8-10(P+S)	:	4-8	:	15-20	:	3
	:	20(P+S)	:	3	:	20-30	:	2-4
	:	5	:	85	:	70-90	:	20
	:	5	:	10-12	:	7-10	:	10
	:	8-10	:	55-60	:	10	:	3
	:	45-55(P+R)	:	16-18	:	18	:	12-14
	:	35	:	5-10	:	12-15	:	6-8
	:	17-21	:	50-60	:	40	:	6-7
	:	4	:	2	:	15-30(P+S)	:	14-15
	:	6-7	:	9	:	6(P+S)	:	17-22
	:	2	:	2	:	2-5(P+R)	:	15-30(P+R)
	:	5-7	:	6-8	:	2(P+R)	:	25-45(P+R)
	:	20-22	:	12-14	:	75-80(P+R)	:	4-8(P+R)
	:	7	:	8	:	10(P+R)	:	4-6
	:	4(P+A)	:	10-30	:	25-30(P+R+Ba)	:	3-5
	:	5(P+A)	:	12	:	12-15(P+R+Ba)	:	7-8
	:	45-55	:	6-8(P+R)	:	28	:	30
	:	20-25	:	10(P+R)	:	12-14	:	45
	:	45-50	:	8-10(P+R)	:	15	:	3-6
	:	40	:	10-12(P+R)	:	35-45	:	30-35
	:	2-4	:	3(P+R)	:	20	:	3-5
	:	75-90	:	5-8(P+R)	:	10-12	:	13(P+R+BM)
	:	8-20	:	25-30(P+R+)	:	12-15	:	9-10
	:	10-25	:	S)	:	15-20	:	12-14
	:	4-5	:	75-90(P+R+)	:	15	:	24
	:	8(P+R)	:	S)	:	10-12(P+R)	:	40-45
	:	20(P+R)	:	10-15(P+R+)	:	50(P+R)	:	20-30(P+R)
	:	15(P+R)	:	S)	:	25-30(P+R+Ba)	:	
	:	15(P+R)	:	6-10	:	10-15(P+S)	:	
	:	35-50(P+A)	:	20-35	:	10-25(P+R+S)	:	
	:	20-50(P+A)	:	20	:	5-6	:	
	:	25-30(P+S)	:	6-7	:	2	:	
	:	10(P+R+)	:	17-20(P+An)	:	18	:	
	:	S)	:	40(P+S)	:	75-85	:	
	:	35(P+R+)	:	35-40(P+S)	:	45-50	:	
	:	An)	:	35(P+S+)	:	15(P+R)	:	
	:	5	:	R)	:	2-3(P+R)	:	

Percentage of				
February :	- March -	:	April :	May
:	:	:	:	:
: 30-35	: 6	: 5-10	:	:
: 5	: 12	: 2	:	:
: 10-12	: 22(P+R)	: 65	:	:
: 20-25	: 6(P+R)	: 17	:	:
: 20	: 16-18(P+R)	: 4	:	:
: 27	: 4(P+R)	: 5-10	:	:
: 34	: 3-5(P+S)	: 10-15	:	:
: 10-15	: 25-50(P+A+R)	: 10	:	:
: 10-12	: 16-17	: 7-8	:	:
: 8	: 6-7	: 12-15	:	:
: 9	: 5	:	:	:

P = Phoma rot A = Alternaria BLE = Blossom End rot
 R = Rhizopus rot An = Anthracnose Bu = Buckeye rot
 S = Soil rot (Rhizoctonia) Ba = Bacterial rot BM = Blue mold rot
 F = Fusarium rot

Soil rot caused by Rhizoctonia sp.

This has been one of the common rots of tomatoes in transit this season. It has been found by market inspectors in cars of tomatoes from Arizona, Florida, Texas, Cuba, and Mexico. Forty-eight cars of Florida tomatoes were found to contain more or less of rot, in some cases running to very high percentages. In a majority of instances it was associated with decays of other kinds.

In Mexican tomatoes the disease was very common. Dr. G. K. K. Link, who observed Mexican tomatoes in California, reported as follows in March, 1920:

"Mexican tomatoes observed on the Los Angeles, Calexico, and Mexicali markets were of very poor quality. Most of the losses in tomatoes in transit to Los Angeles were due to soil rot (Rhizoctonia). Many of the affected fruits showed the primary lesions with concentric rings of alternating light and dark brown color, much better than I have ever seen them in Florida tomatoes on the market."

The severity of soil rot in shipments of tomatoes grown in Mexico is shown in the accompanying table.

Table 3. Percentage of soil rot found in Mexican tomatoes by inspectors of the Bureau of Markets, January to May, 1920.

Date	Percentage of decay	Cause of decay		
		Rhizoctonia	Rhizopus	Phoma
Jan. 22	12-15	x	:	:
Feb. 14-20	5-15	x	:	:
	16	x	:	:
	15-25	x	:	:

Date	Percentage of decay	Cause of decay		
		Rhizoctonia	Rhizopus	Phoma
Feb. 27-28	10	x		
	25	x		
Mch. 1-2	1-2	x		
	2-5	x		
	6-8	x		
Mch. 4-6	3-5	x		
	10-15	x		
Feb. 29	5	x		
Mch. 5-10	15-25	x		
	3-4	x		
	15-25	x		
	5-15	x		
Mch. 10-13	8-10	x		
	2-4	x		
	3-5	x		
	4-8	x		
	3-5	x		
	4-8	x		
	6-8	x		
	4-6	x		
	10-15	x		
Mch. 13-19	8-10	x		
	2-4	x		
	5-8	x		
	15-20	x		
	4-6	x		
	8-10	x		
Mch. 19-22	2	x		
	4-8	x		
	10-12	x		
	3-5	x		
Mch. 19-22	12	x		
	5-8	x		
	2-4	x		
Mch. 30-19	2-3	x		
	10	x		
	3	x		
	25	x		
	5	x		
	10-12	x		
	10-15	x		
Apr. 12	2	x		
Apr. 14	4-8	x		
	3-5	x		
May 10-14	20-25	x		
	15-20	x		

Blossom end rot (non-parasitic)

According to J. A. McClintock, this trouble is very prevalent to date in Georgia, largely on account of dry weather during the past month. The disease is also showing up to some extent on tomatoes in suburban gardens in the District of Columbia.

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UNITED STATES DEPARTMENT OF AGRICULTURE

THE PLANT DISEASE BULLETIN

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THE PLANT DISEASE SURVEY

Vol. 1V

Number 3.

More Potato Wart found in Pennsylvania.

The party of potato wart survey men, working in western Pennsylvania under the leadership of W. L. Garis and under the direction of C. R. Orton of State College and the Plant Disease Survey, have discovered new infestations of wart at Robertsdale, Huntingdon County. Robertsdale is near Woodvale, where the disease was located on July 28 of this year, and is about 15 miles from Saxton. In Robertsdale several gardens have been found infested, many of them badly so, as 50-90% of the plants are affected in some cases. The disease has been present in Robertsdale for several years as shown by the prevalence of the disease and the reports of persons raising potatoes.

A number of new infestations have also been found at Thomas, West Virginia and some of them are rather heavy according to a recent report of N. J. Giddings. The disease has not yet been found this year in any new towns in West Virginia.

CEREALS AND FORAGE CROPSWHEAT

The harvest of winter wheat has been completed under favorable weather conditions, according to Department of Agriculture reports. The yield and quality for the most part proved satisfactory. Black stem rust did not do much damage to the crop as a whole, although in Nebraska late wheat was said to have suffered more than was expected.

Spring wheat harvest is well under way. In the western part of the spring wheat area high temperature and lack of moisture unfavorably affected the crop, while black rust and scab cut the yield and quality markedly in the Dakotas, Minnesota, Iowa and Wisconsin, particularly in the latter planted fields (Nat. Weather and Crop Bul., Aug. 3, 1920).

Stem rust caused by Puccinia graminis.

Winter wheat largely escaped damage from stem rust. The rust was reported from a number of states but it was only in Northeastern

Nebraska and Southeastern West Virginia that any serious damage appears to have been noticed by collaborators.

The spring wheat crop, however, has been very adversely affected. In Wisconsin some late planted fields will hardly yield 1/4 of a crop. In Nebraska about 50% loss in the northeastern part of the state is estimated and many fields are not being cut on account of rust. The Dakotas and Minnesota are also suffering. While it is too early to estimate losses to spring wheat it would seem that this year's outbreak of rust bids fair to equal the epidemic of last season.

Pennsylvania: (Thurston, July 15) Not serious in any part of the state this year. Infections local and no damage reported. Escaped barberry on College farm, but has not been observed rusted.

West Virginia: (Giddings, July 1) Reported as quite prevalent in southeastern part of state. Noted to some extent in Eastern Panhandle, but not so prevalent as in 1919.

Indiana: (Gardner, July 15) Fairly common in small amount late in season. No serious damage reported.

Illinois: (E. C. Stakman) Fifteen to 20% infection at edge of some fields near Peoria. Less than 1% reduction in yield for the locality. Infection much heavier at Galesburg, where the wheat is later and where 2-5% reduction is taking place.

Michigan: (Bessey, Aug. 1) Severe in Upper Peninsula.

Wisconsin: (Vaughan, Aug. 1) Very severe. Noticeably greater amount where any scattering barberry bushes remain. Very early plantings have ripened ahead of much loss. General estimated reduction in yield 10 to 50%.

South Dakota: (Champlin, July 20) Rust is bad on Marquis wheat (Florence).

Nebraska: (Goss, Aug. 1) Very severe. Many fields not being cut. About 50% loss in the northeastern section of the state.

Arkansas: Common but too late to do any damage.

Idaho: (Hungerford, July 15) Only a trace noted in fields in North Idaho. None noted in the southern part of the state.

Scab (blight) caused by Gibberella saubinetii

Scab has been noticeably much less prevalent than usual in the winter wheat area this year. In some of the spring wheat states, however, it is the cause of considerable trouble but even there it does not seem to be so abundant as last year.

Pennsylvania: (Thurston, July 16) Reported as slight in Armstrong, Adams, and Northumberland Counties. Becoming serious in Franklin County.

West Virginia: (Giddings, July 1) Very little scab in any section of the state. More of it in the Ohio Valley than in the eastern Panhandle. The loss this year is very slight and quite in contrast with the 1919 season. I believe this largely due to different weather conditions when the grain was in bloom.

Tennessee: (C. Kurtzweil, In Cereal Courier, July 10) Wheat scab has been very light this year. The estimated damage is less than one per cent.

Ohio: (Selby, July 15) While we have prolonged rainy periods with much

cloudy, cool weather during the harvest season in Ohio, the scab infection, *Fusarium*, upon wheat appears much less prevalent than in 1919. It is felt that the greater care in the preparation of seed wheat and attention to screening and seed treatment have been important in this respect.

Indiana: (Gardner, July 15) Relatively small amounts compared with last year.

Wisconsin: (Vaughan, July 15) Less than last year. Traces can be found in nearly every field. Have seen nothing over 3%. There is danger of confusion with joint worm injury which is general.

(Vaughan, Aug. 1) A few scattering heads can be found in most fields. Marquis wheat in southern part of state generally infected 1-2%, except when on corn ground 1919 where 10-15%.

Iowa: (Melhus, Aug. 1) Trace to 70% in winter wheat.

Nebraska: (Goss, Aug. 1) Severe infection around Dakota County. 25-50% of the wheat in this section is infected with scab.

Arkansas: (Elliott, July 1) Not of any importance. Some present.

Leaf rust caused by *Puccinia triticina*

Leaf rust apparently has not been a factor of any importance in reducing the yield of wheat this year.

Pennsylvania: (Thurston, July 15) Very general over most of the State. Not serious, no damage.

West Virginia: (Giddings, July 1) Very abundant. In practically all sections of the state.

Ohio: (Thomas, July 15) The prevailing rainy weather during the month of June and early July supplied ideal conditions for the spread and development of leaf rust. Practically 100% infection has been noted. All varieties seem to be equally badly attacked.

Indiana: (Gardner, July 15) Very little - came late in the season. Some localities, notably Vincennes, Indiana, occurring in high percentage, but very late.

Wisconsin: (Vaughan, Aug. 1) General along with stem rust. Damage questionable in most cases.

Arkansas: (Elliott, July 1) Common but much lighter than last year.

New Mexico: (Leonian, July 1) More abundant than stem rust, but not serious enough to do any damage.

Idaho: (Hungerford, July 15) Traces in some fields in North Idaho.

Washington: (Heald and Dana, Aug. 1) On early seeded winter wheat at Pullman. Not very severe.

Stinking smut caused by *Tilletia laevis* and *T. tritici*

Pennsylvania: (Thurston, July 15) Apparently little in the State. Reported as "slight" and "local" from Northumberland, Cumberland, Blair, Lebanon and Berks Counties.

Virginia: (Fromme, July 1) Very little bunt noticed in western part of State.

Tennessee: (Hesler, July 1) Reports of county agents show an average of 1.7% infection from 17 counties. Much less troublesome than loose smut.

Wisconsin: (Vaughan, Aug. 1) Very much less than usual. Only a few fields with any specimens and then only widely scattering plants. Loss, trace.

Washington: (Heald and Dana, Aug. 1) Prevalent throughout the wheat growing district. Two threshing machine explosions already reported.

Kansas: In Kansas field inspections of Kanred wheat have been made this year for the purpose of locating sources of pure seed of this variety. Inspectors paid particular attention to the presence of varietal mixtures, rye, weeds, and smut. Prof. John H. Parker reported on the presence of bunt in these fields, as follows (Cereal Courier 12: 204., July 10, 1920):

"The field inspection of Kanred wheat has been completed. More than 400 fields of Kanred wheat were inspected this year in all parts of the State, representing a total area of between 15,000 and 20,000 acres. In many counties of the State, from a trace to rather high percentages of stinking smut were found. Growers are being urged to treat all Kanred seed to be sown this fall and some of the larger growers in each county will probably treat all of their seed which is to be sold. Such a widespread and severe epidemic of stinking smut in Kansas has not been known for a good many years. It is thought that climatic conditions and late seeding made necessary by dry soil last fall favored the development of smut."

Loose smut caused by Ustilago tritici

Pennsylvania: (Thurston, July 15) Very common and doing more damage than is generally believed. Average loss probably 2%.

West Virginia: (Giddings, July 1) Examination of fields in eastern part of the state show from 3 to 10% in most of them, although some had less than 1%. Hot water treatment as tested in five fields gave absolute control for the treated plots, while the untreated fields showed 1-3% for two of them and 5-6% for two others. The fifth field showed only a trace.

Wisconsin: (Vaughan, Aug. 1) Less than usual. A few heads can be found in most fields. Loss, trace.

Black chaff caused by Bacterium translucens undulosum.

Black chaff has not been reported yet from a number of states where it occurred last year. Persons reporting this disease should make sure to distinguish it from Septoria with which it is easily confused.

Wisconsin: (Vaughan, July 15) Small amount in experiment plots at Madison. None seen or reported in field.

Iowa: (Melhus, July 15) Present on leaves, only trace on heads. Much less than last year.

South Dakota: (Champlin, July 20) Black chaff more pronounced than usual at Florence. Don't know what the damage will be. Rust is bad.

Kansas: (Melchers, July 15) Present in very slight amounts in only a very few fields in the state. No damage whatever occurred.

Glume blotch and leaf spot caused by Septoria spp.

Pennsylvania (Thurston, July 15) In certain localities is quite serious. 50-90% glume spot has been observed on experimental wheat plots at State College.

West Virginia: (Giddings, July 1) Quite prevalent in nearly all wheat fields.

Ohio: (Thomas, July 15) A species of Septoria forming a glume spot seems to be very wide-spread, attacking all varieties noted. In all cases, however, seriously infected heads show bad infestation of the Hessian Fly. To what extent the fungus is responsible for the primary infection cannot be stated. It is thought to be a secondary matter.

Tennessee: (C. Kurtzweil) Septoria on wheat caused some damage on the early wheat and very much damage on the late wheat. Reports of one-hundred per cent infection came from Knox and Miles Counties.

Iowa: (Melhus, Aug. 1) Considerable in winter wheat in rosette stage. None in heads as last year.

Alabama: (Thiel, July 15) Prevalent throughout the state. Infection usually very heavy.

Anthracnose caused by Colletotrichum cereale.

Alabama: (Thiel, July 15) Present in small quantities.

Kentucky: (Valleau, July 1) A considerable amount present on some of the late wheat but appears to be causing very little damage, as it is attacking mostly the outer extremities of the glume.

Ohio: (Selby, July 15) Not so abundant as in 1919. Short stalk forms chiefly referable to attacks of Hessian Fly though anthracnose present chiefly in slight amounts.

Iowa: (Melhus, July 15) Only a trace.

Mildew caused by Erysiphe graminis

Ohio: (Thomas, July 15) Present in increased amounts in cereal variety plots at Ohio Experiment Station. Percentages of stalks with abundant infection of leaves attacked reaching as high as 25% (On winter barley exceeding 90%).

Root rot.

Idaho: (Hungerford, July 15) A root rot from which Fusarium sp. has been isolated has been found in Minidoka County in South Idaho this year.

BARLEY

Covered smut caused by Ustilago hordei

Reports from Vermont and Indiana indicate that this smut is present in about the usual amounts while notes from Ohio, Wisconsin, and Idaho point toward less than normal abundance.

Loose smut caused by Ustilago nuda

Loose smut is reported from Vermont, Ohio, Indiana, Wisconsin, Nebraska and Oklahoma. In all these states the damage is reported as negligible or slight. In most cases the disease is said to be less prevalent than usual. However, Vermont and Indiana report it as being present in about the usual amounts.

Stripe caused by Helminthosporium gramineum

Vermont: (Lutman, August 1) Not observed.

Ohio: (Thomas, August 1) This disease was found in one field where no seed treatment was made.

Indiana: (Gardner, August 1) Present.

Wisconsin: (Vaughan, August 1) Less than for several years. Traces can be found in most fields. One field in Racine County showed 15%.

Tennessee: (Kurtzweil, May 20) Very plentiful in station plots.

Oklahoma: (Learn, August 1) This was only noticed on the College Farm, but there it was present only in small amounts.

Washington: (Heald and Dana, August 1) No reports.

California: (Florell, Plant Introduction Station, Chico, May 14) Traces were observed in a few instances.

Stem rust caused by Puccinia graminis

Stem rust was reported as unimportant in Vermont, Wisconsin, Nebraska and Oklahoma.

Wisconsin: (Vaughan, August 1) General. Losses minor as grain was nearly mature when rust appeared.

Nebraska: (Goss, August 1) Moderate infection, light loss.

Net blotch caused by Helminthosporium teres

Indiana: (Gardner, August 1) Present.

Wisconsin: (Vaughan, August 1) General and often confused with stripe.

California: (Florell, Plant Introduction Station, Chico, May 14)

Traces were observed in a few instances.

Spot blotch caused by Helminthosporium sativum

Indiana: (Gardner, August 1) Present.

Wisconsin: (Vaughan, August 1) General. Seedling losses severe in a few cases.

California: (Florell, May 14) Traces were observed in a few instances.

Mildew caused by Erysiphe graminis

Ohio: (Thomas, August 1) Due to prevailing weather conditions. Mildew attacks have been very severe in some sections as is particularly noticeable where the rate of seeding is heavy. Mildew has occasioned more loss than rust.

OATS

Smut caused by Ustilago avenae and U. levis

Delaware: (Manns, July 15) Not so severe as usual.

Virginia: (Fromme, July 15) Winter oats almost a complete failure due to winter killing. Considerable loose smut seen on spring oats in Augusta County, will average about 5%.

West Virginia: (Giddings, July 15) Five to ten per cent of heads affected in untreated fields.

Tennessee: (Hesler, July 15) Both smuts very common this year, with U. levis probably predominating. A 10% loss was frequent.

Kentucky: (Valleau, July 15) About $\frac{1}{2}\%$ in neighborhood of Lexington.

Mississippi: (Neal, July 1) Smut is present in about the same amount as last year. According to Beal the estimated reduction in yield is about 5% for the state.

Louisiana: (Edgerton, July 15) Both species present. Infection light.

Texas: (Taubenhaus, July 1) Prevalent.

Kansas: (Melchers, July 15) Both common in fields where seed was not treated.

New Mexico: (Leonian, July 15) Slight.

Washington: (Heald & Dana, July 15) U. levis about the same as in previous season.

RYE

Stem rust caused by Puccinia graminis

Stem rust of rye has apparently caused very little damage this year in the states from which it has been reported.

Wisconsin: (Vaughan, July 15) Very slight infection. Traces were found just as fields were ripening. Loss probably 0 to trace. Rye is a heavy crop this year on the light soils in central Wisconsin.

Oklahoma: (Learn, July 15) This crop is not raised to any extent in Oklahoma. No report of rust occurrence has been received, but I found it quite plentiful on the experimental plots on the College Farm.

Leaf rust caused by Puccinia dispersa

- Ohio: (Thomas, July 15) All fields show heavy attacks. Weather conditions, as for wheat, have been for the spread and development of leaf rust.
Indiana: (Gardner, July 15) Trace.
Wisconsin: (Vaughan, July 15) Traces only were found.
Kentucky: (Valleau, July 15) Slight. Not causing damage.

Ergot caused by Claviceps purpurea

Ergot seems to have been much less common than usual this year. In some places where it has been prevalent the last few years it is difficult to find any this season.

- West Virginia: (Giddings, July 15) Quite prevalent in some experimental fields in Monongalia County.
Indiana: (Gardner, July 15) Rare except in volunteer rye.
Illinois: (Stakman, July) A small amount in several fields.
Michigan: (Coons, August 1) None observed in rye fields. Volunteer plants completely free.
Wisconsin: (Vaughan, July 15) Ergot is found everywhere but in small amounts only, less than 2%. Scattering volunteer plants have more ergot than plants in uniform stand.
North Dakota: (Bolley, July 15) No ergot yet showing. Not yet sufficiently developed to determine the per cent of destruction. Only scattering heads seen.

ALFALFA

Leaf spot caused by Pseudopeziza medicaginis

This disease is reported by J. G. Brown as common in Southern Arizona and severe in the Verde Valley causing a loss which is probably considerable but impossible to estimate because of the prevalence of the bacterial disease (Pseudomonas medicaginis).

Bacterial blight caused by Pseudomonas medicaginis

This disease is reported from New Mexico and Arizona. In the former state L. H. Leonian says it is doing much damage in combination with Ascochyta imperfecta. In Arizona it occurs with Pseudopeziza medicaginis. One field near Tucson had from 40-50% of the plants affected with bacterial blight. This disease is claimed by smelter operators in Arizona to be responsible for many of the complaints of injury from smelter smoke.

Leaf blight caused by Ascochyta imperfecta

Leaf blight and bacterial blight occurring together are reported by L. H. Leonian from New Mexico as follows:

"The alfalfa stem spot, caused by Pseudomonas medicaginis, is doing much damage here this year. It occurs with Ascochyta imperfecta, and between the two alfalfa does not have much chance. Wilting, defoliation and general reduction in the crop are the natural results."

Downy mildew, caused by Peronospora sp., is reported as general but causing slight damage in the Verde and Rillito Valleys in Arizona.

VEGETABLES AND FIELD CROPS

POTATO

Late blight caused by Phytophthora infestans

Since August 1 late blight has been reported to the Survey from Maryland, New Jersey and Vermont. Word from Massachusetts and New Hampshire has been received that the disease has not been reported up to August 1.

In Maryland, C. E. Temple reported having specimens from Frostburg and Grantsville July 21 and 22. It was present at that time in at least four fields, slightly affecting the leaves.

From New Jersey, M. T. Cook reports serious damage as follows, August 13:

"We have had an exceptionally severe outbreak of late blight on the potatoes throughout the central part of the state, especially in the east central portion. The result is a large amount of rot on the American Giant. We are having excessive rains and if the conditions continue as at present, the losses will be exceptionally heavy."

In Connecticut, potato wart survey men found it prevalent in several gardens about New London.

In Vermont, C. R. Stevenson, pathologist for the Corinna Seed Potato Farms, Inc., Corinna, Maine, reported late blight infection at Rochester, Vermont, on August 4. The disease was scattered in one field infecting 15-20% of the foliage but not causing any particular damage at that time.

Further word has been received from New York that the disease is progressing on the eastern end of Long Island and is affecting many fields there. The outbreak in Oneida, Wisconsin, has been temporarily checked by dry weather (August 1). The more progressive farmers are continuing to spray with the Bordeaux, however.

More reports of the disease have come in from West Virginia, Randolph and Monongalia Counties being added to the list.

Pennsylvania: (Thurston, Aug. 1) Rapidly making its appearance. Reported July 29-31 from Somerset, Carbon, Northampton, Schuylkill, Centre and Luzerne Counties; August 1-7 from Indiana, Westmoreland, Bradford and Wayne Counties. Found only on unsprayed fields or fields where spraying has been neglected. An extensive and intensive spraying campaign put on by Mr. E. L. Nixon and his assistants will greatly reduce loss from late blight.

Early blight caused by Macrosporium solani

Early blight is appearing generally but is not causing appreciable damage as yet.

- New Hampshire: (Butler, Aug. 1) Rather scarce, damage done negligible.
Massachusetts: (Krout, Aug. 1) Prevalent throughout the state.
New York: (Chupp, Aug. 1) A trace of early blight may be seen in many potato fields, but no serious cases have been reported.
New Jersey: (Cook, Aug. 1) Very common but no more severe than usual.
Virginia: (Fromme, Aug. 1) Common but not severe.
West Virginia: (Giddings, Aug. 1) Not noted as prevalent or as causing serious injury thus far.
Mississippi: (Neal, Aug. 1) Common in a number of fields this season, but in only one instance has much damage resulted. Adams County reports a loss of 5% in one field.
Michigan: (Coons, Aug. 1) Occasional spots found, not in epidemic form.
Indiana: (Gardner, Aug. 1) More prevalent than last year at this time. Not of serious economic importance in Indiana, however.
Wisconsin: (Vaughan, Aug. 1) Slight amount present; losses probably small.
Minnesota: (Stakman, Aug. 1) Almost universally present, but no appreciable damage has been done with the exception of a few of the southern potato growing counties.
Nebraska: (Goss, Aug. 1) Slight infection.
Idaho: (Hungerford, Aug. 1) A trace of early blight has been found in a number of fields.

Black leg caused by Bacillus phytophthorus

- New Hampshire: (Butler, Aug. 1) Present in small amount in the fields of the northern counties, rare in the southern part of the state.
Massachusetts: (Krout, Aug. 1) Occurring in some fields.
Virginia: (Fromme, Aug. 1) Considerable black leg reported from trucking section about Norfolk and Eastern Shore.
West Virginia: (Giddings, Aug. 1) Black leg is again very prevalent in some of the higher sections of Tucker County. It is estimated as affecting from 3-5% of the hills in several large fields visited.
Minnesota: (Stakman, Aug. 1) Common and widespread. Doing considerable damage in some fields. As many as 15% of the plants have been killed in some fields.
Washington: (Heald & Dana, Aug. 1) Two reports.

Mosaic, (cause unknown)

- New Hampshire: (Butler, Aug. 1) Very abundant, especially prevalent on Green Mountains.
- Vermont: (Lutman, Aug. 1) Fairly common. Many of seed fields show 10-50%. No marked increase noted, however.
- Massachusetts: (Krout, Aug. 1) Prevalent throughout the state.
- New York: (Chupp, Aug. 1) Mosaic on potatoes was reported first on Long Island June 21, and up-state in Steuben County, June 28. It is one of the most prevalent diseases found on potatoes in the state. (See tabulated reports for 1918 and 1919 for severity and losses in yield).
- New Jersey: (Cook, Aug. 1) Very common. Certified seed giving better results than ordinary seed.
- Mississippi: (Neal, Aug. 1) Present in many sections of the state, especially on Bliss Triumph. However, the damage does not appear to be as great as last year.
- Michigan: (Coons, Aug. 1) Found occasionally. Loss not appreciable.
- Wisconsin: (Vaughan, Aug. 1) Hardly a field of Triumph but what will show some plants having mosaic. Fields from the stock of J. W. Smith, Kent, Wisconsin, are remarkably free from mosaic.
- Minnesota: (Stakman, Aug. 1) Mosaic is very prevalent and destructive. The disease has occurred mostly on Triumphs. In a number of fields as many as 15% of the plants are severely infected, and in many fields 25-30% of the plants are moderately infected. In some places the Triumphs are practically ruined. In fact growers are beginning to discontinue the growing of this variety on account of the disease. The disease also is fairly prevalent on the Green Mountain variety, but its effect is rather mild as compared with its effect on Triumphs. There is very little mosaic on the Early Ohio, and a trace on the Cobblers.
- Kentucky: (Valleau, Aug. 1) Prevalent about Louisville and causing serious reductions in yield except where care has been used in seed selection.
- Tennessee: (Hesler, July 15) Forty per cent hills in one garden affected. No special survey made.
- Arkansas: (Rosen, Aug. 1) Quite common and abundant in certain seed lots.
- Oklahoma: (Learn, Aug. 1) Present in some of the patches about Stillwater.
- Nebraska: (Goss, Aug. 1) Considerable mosaic reported from various parts of the state.
- Idaho: (Hungerford, Aug. 1) A disease which resembles mosaic but which does not seem to have all the symptoms of the disease as it occurs in the east, is very common in Idaho this year in both North and South Idaho.

Leaf roll (cause unknown)

- New Hampshire: (Butler, Aug. 1) Only a few cases have been observed.
- Vermont: (Lutman, Aug. 1) Occasional fields throughout the state are affected with 5-25% but on the whole, it does not seem to be as important as mosaic.
- Massachusetts: (Krout, Aug. 1) Prevalent in the usual amount.
- New Jersey: (Cook, Aug. 1) Much more abundant than usual.

- Virginia: (Fromme, Aug. 1) Reported as occurring to some extent in Eastern Shore section together with mosaic, but not at all serious.
- Kentucky: (Valleau, Aug. 1) Many small fields of potatoes about Bardstown and in some other sections, grown from northern seed (variety unknown), produced very large vines, the lower leaves of which rolled upward beginning about blossoming time. In place of tubers long stolons were produced which came up as a shoot between the rows and eight inches to one foot from the base of the plant, showing no rolling of the leaves. Produced normal tubers.
- Michigan: (Coons, Aug. 1) Some in every field examined.
- Minnesota: (Stakman, Aug. 1) Negligible in the principal potato growing sections.
- Nebraska: (Goss, Aug. 1) Leaf roll recorded from a few sections along with mosaic diseases.
- Idaho: (Hungerford, Aug. 1) Potato leaf roll is quite common in North Idaho this year.

Rhizoctonia disease caused by Corticium vagum solani

- Kentucky: (Valleau, Aug. 1) About 15% in fields near Louisville causing rotting of stem or growing point.
- Ohio: (Detmers, Aug. 1) Field indications show a widespread infection but on account of the lateness of planting the semi-late potatoes it is too early to estimate the percentage of loss.
- Minnesota: (Stakman, Aug. 1) Rhizoctonia has been rather prevalent and destructive. In some fields as many as 25% of the plants were severely infected. During late July many fields were severely affected. Many aerial tubers were being formed and the yield was considerably reduced.
- Washington: (Heald & Dana, Aug. 1) Reported from all parts of the state.

Tip burn (non-parasitic), and hopper burn caused by leaf hoppers.

- Vermont: (Lutman, Aug. 1) Has been a peculiar year - plenty of rain and cool weather after the rain. The result has been that tip burn is almost non-existent. Very little brilliant sunshine and much cloudy weather has made 1920 so far an ideal potato year.
- Michigan: (Coons, Aug. 1) First hopper-burn found July 10. Dead areas rather blotch-like, seldom of typical "V" shape. Loss in early potatoes less than last year. Leaf hopper nymphs exceedingly common on late potato leaves.
- Nebraska: (Goss, Aug. 1) Considerable tip-burn found in all potato fields examined in eastern part of the state.
- (Weekly Crop Notes, June 24, 1920) The sudden change from cool, wet weather to high temperatures and dry weather has caused some tip burn.

Calico (cause undetermined)

- Idaho: (Hungerford, Aug. 1) This disease, which was reported last year from

Idaho, occurs especially in the southern part of the state. The average for the districts visited would be about 1% of the stand.

TOBACCO

Wildfire caused by Bacterium tabacum
and
Angular leaf spot caused by Bacterium angulatum

Wildfire and angular leaf spot are reported from Virginia and Kentucky. In Virginia wildfire is being found occasionally but is not severe as yet, (August 1). Angular leaf spot is reported as follows from Virginia:

"Not as severe as in previous years but found to some extent in practically all fields in the flue-cured belt. Found for the first time this year on Burley tobacco in Washington County together with slight Wildfire."

The following report from Kentucky, by W. D. Valleau, is of interest:

"I wish to report to the Plant Disease Survey the widespread occurrence of wildfire (Bacterium tabacum) and the angular leaf spot (Bacterium angulatum) on tobacco in the Burley and dark tobacco sections of Kentucky. Both of these diseases are causing extensive damage to tobacco in the Burley section. Wildfire has not been reported in the state previous to this year.

"Wildfire was found quite extensively in seed beds last spring killing plants in large areas of beds. Fields planted from such beds are generally infected.

"The origin of the angular leaf spot has not been determined, but it is likely also to have originated in the seed beds."

Root rot caused by Thielavia basicola

Virginia: (Fromme, August 1) Rather severe in several fields in Charlotte County. Occurring in spots of varying sizes. Some plants are badly dwarfed and will not make a crop.

Mosaic (cause undetermined)

Virginia: (Fromme, August 1) Slight; a small percentage of plants affected in occasional fields. Have never seen it in the state as a serious disease.

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More potato wart

New occurrences of potato wart are being found in the vicinity of Thomas, West Virginia according to word received from N. J. Giddings. During the past two weeks more infested gardens have been discovered also in Pennsylvania by men of the Pennsylvania State Department of Agriculture, according to recent advice of W. A. McCubbin.

Spring wheat crop out

The combination of stem rust and scab has made ravages in the spring wheat crop, particularly in South Dakota, Nebraska, and parts of Iowa and Minnesota. Some fields are so badly affected as to be not worth the harvesting (see page 54).

Potato late blight menacing in the Northeast section

Rainy weather has favored the development of Phytophthora infestans in the Middle Atlantic and New England States. The organism is well established and already has caused much loss from blight and rot on Long Island and in New Jersey. An epiphytotic in this section of the country seems inevitable if the September weather is at all favorable to the fungus.

Early blight of potatoes is less abundant than usual this year (Pl. Dis. Bul. 4: 49, 1920).

Mosaic and leaf roll are being found widespread over the country and their importance is becoming recognized.

Bean anthracnose less but bacterial blight general

Anthracnose seems to be noted for its absence in many sections of the country. On the other hand bacterial blight is widespread and causing heavy losses. Rust is just beginning to become serious in those sections of the country where it does damage.

Tomato diseases seem to be present in about the normal amounts, Septoria leaf spot and Fusarium wilt taking heavy tolls.

Plum pockets were especially common this year in some states. It is hoped that some reasons for this will be forthcoming.

CEREALSWHEATStem rust caused by Puccinia graminis

Stem rust has brought about extremely heavy losses to spring wheat this year. It is especially bad in South Dakota, Nebraska, and Iowa, and is very serious also in Minnesota and North Dakota. This disease combined with scab has made such ravages in the crop as to greatly discourage farmers. The following quotations will show the situation more in detail.

South Dakota: (Evans, Aug. 17) Rust developed fast under most favorable conditions (foggy weather) during the middle and latter part of July. These two diseases alone have ruined a most promising crop, the best prospect South Dakota has had in years. Many fields will not make more than one or two bushels per acre and that of inferior grade.

Nebraska: (Weekly crop notes*, Aug. 5) "Heavy damage from black rust and scab. A considerable portion of northeastern section will not be harvested, due to injury from rust and scab."

(Weekly crop notes*, Aug. 19) "Crop very light, due to rust and scab."

Iowa: (Weekly crop notes*, Aug. 5) "Complaints are quite general especially throughout the western and northeastern sections that the crop is badly hit by rust. Some fields are reported not fit to harvest and will be plowed under."

Illinois: (Weekly crop notes*, Aug. 19) "Black rust increasing in the north and shriveling much of the grain. Prospects not very good."

Scab caused by Gibberella saubinetii

Since the August 1 report, scab has developed greatly in the spring wheat states, causing heavy losses. Reports of damage are at hand from Northern Illinois, the Upper Peninsula of Michigan, Minnesota, North Dakota, South Dakota and Nebraska. In the northeast quarter of South Dakota it is estimated by some of the men at the Agricultural Experiment Station at Brookings that scab reduced the yield about 30%. This disease, along with stem rust, is reducing the yield so greatly that many fields will yield only 1-2 bushels per acre and many others were injured so badly that it did not pay to harvest the grain.

The Weekly Crop Notes of the Bureau of Crop Estimates gives the following, under date of August 5, concerning the situation in northeastern Nebraska.

"Heavy damage from black rust and scab. A considerable portion in the northeastern section will not be harvested, due to injury from rust and scab."

POTATO

Late blight caused by Phytophthora infestans

Late blight has secured a strong foot-hold in the northeastern states. This area suffered heavily from the disease last year, with the result that many seed tubers carried the organism. The rainfall in the Middle Atlantic and New England states has been rather heavy during August and in addition there have been many cloudy days and periods of high humidity. The organism is therefore widespread and heavy losses may be expected if the September weather is at all favorable for it. Already the New Jersey crop of Giants has been cut considerably on account of blight and rot. One carload of New Jersey potatoes inspected at Baltimore, August 5, showed 30% of the tubers affected with late blight rot.

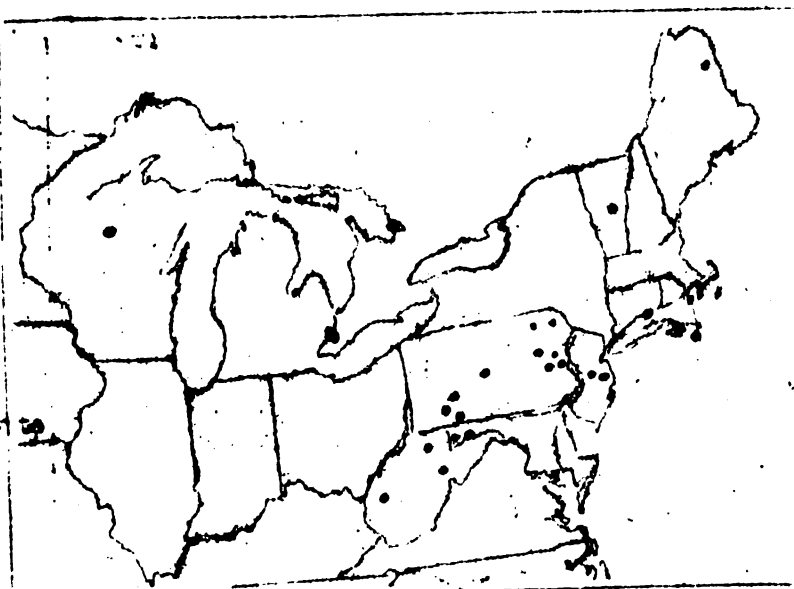


Fig. 1. Map showing occurrences of late blight of potato in northern states as reported to the Plant Disease Survey during July and August, 1920

The following table gives the dates when the disease was first reported in the northern states:

Table 4. Dates when late blight of potato was first reported as being found this year in northern states.

State	County	Date when first noticed	State	County	Date when first noticed
Vermont	Windsor	August 4	Pennsylvania	Somerset	July 29
Massachusetts	--	August 9	Maryland	Garett	July 21
Connecticut	--	August 1	West Virginia	Putnam	June 27
New York	Suffolk	June 11	Wisconsin	Oneida	June 25

Fusarium wilt caused by Fusarium oxysporum.

Fusarium wilt became evident last month in many portions of the late potato belt where it commonly occurs. Indications are that it was somewhat

later than usual in making its appearance on account of the backwardness of the season.

Ohio: (Miss Detmers, Aug. 1) This seems widespread and quite prevalent. It is a little early to be able to estimate how much damage has been done.

Texas: (Taubenhaus, Aug. 1) Prevalent - 2% loss.

New Mexico: (Leonian, Aug. 1) Abundant in some sections.

Nevada: (Lantz, Aug. 1) Some wilt is reported. Loss not yet determined.

Idaho: (Hungerford, Aug. 1) The Fusarium wilt and rot is again quite common in Southern Idaho and has also been noted in various fields in North Idaho.

Leaf roll (cause undetermined)

For those who do not consider leaf roll of potatoes an important potato disease, the following report from collaborators in Pennsylvania will be of interest:

"E. L. Nixon, Extension Pathologist, who is continually in the field and spending his time largely on work with potato diseases, reports that the average amount of leaf roll for all fields in the State will approximate 20%. This is the most important potato trouble in Pennsylvania. Careful roguing of fields for seed is having pronounced effect in reducing this percentage."

BEAN

Bacterial blight caused by Bacterium phaseoli.

Judging from the reports thus far received, blight is general this year and causing considerable damage. It seems that the important bean state of Michigan will lose rather heavily from the disease.

Vermont: (Lutman, July 15) Fairly common on garden beans. The foliage grew very rank in early July and about the middle of July it began to blight in many cases. Not noted on field beans on poor land where they are usually planted.

Massachusetts: (Krout, Aug. 15) Present but not causing serious loss.

West Virginia: (Giddings, Aug. 15) Observed in several localities but reported as serious in only one locality.

Ohio: (Thomas, Aug. 15) Blight has been noted to be about equally as prevalent as anthracnose.

Michigan: (Meckstroth, July 29) A little bacterial blight scattered throughout most all fields about Saginaw.

(Coons, Aug. 15) Everywhere, doing serious damage to leaves and producing node injury, in which plants break off near the ground.

Wisconsin: (Vaughan, Aug. 15) Considerable blight has been observed associated with dry weather injury.

Tennessee: (Essary, Aug. 15) There has been considerable damage caused by

blight generally over the state.

Texas: (Taubenhaus, July 15) Prevalent - 1% loss.

Idaho: (Hungerford, July 1) Found in one of the gardens in Moscow on Oregon Giant beans. This is the first time the disease has been reported for the state to our knowledge.

Anthracnose caused by Colletotrichum lindemuthianum

Anthracnose is generally much less important than usual. It is suggested that the rather general freedom of the seed from anthracnose lesions, coupled with dry weather during the early stages of growth, is largely responsible for the reduced amount of this disease.

Vermont: (Lutman, July 15) Very small infection - smallest in years - may be due to the very dry early June.

Massachusetts: (Krout, Aug. 15) The usual amount.

West Virginia: (Giddings, Aug. 15) Quite generally prevalent but not causing a serious amount of damage so far as has been reported.

Ohio: (Thomas, Aug. 15) Although the presence of anthracnose has been noted in all parts of the state visited, damage this season has been slight, contrary to what might be expected as the result of prevailing wet weather. It is anticipated that the disease will assume a more serious tendency later in the season.

Michigan: (Bessey, Aug. 15) Exceedingly rare up to the end of the first week in August. Now beginning to show up in a number of places but not in serious epidemic form as yet.

Wisconsin: (Vaughan, Aug. 15) Less than usual. It has been too dry.

Tennessee: (Essary, Aug. 15) Very little anthracnose has been observed this season.

Texas: (Taubenhaus, July 15) Prevalent on spring snap beans - one half of 1% loss.

Rust caused by Uromyces appendiculatus

Rust is causing considerable damage to susceptible varieties in some of the central eastern states. This is evidenced by the following reports. In the more northern states where the disease is not usually of much importance it has either not been reported or is of no consequence.

West Virginia: (Giddings, Aug. 15) Quite general and very destructive in the central part of the state. Specimen of pods received showing a very large amount of infection. It has been quite unusual to find any of the rust on the pods.

Tennessee: (Essary, Aug. 15) Rust is common and quite severe. It is just reaching its most destructive stage. Reports are coming in of serious damage in some sections.

New Mexico: (Leonian, Aug. 15) Quite abundant in southeastern parts of state.

Scald (non-parasitic)

Wisconsin: (Vaughan, Aug. 15) The long continued period of dry weather, July

1.1.10 August 8. caused many beans to drop blossoms. Sun scald has been prevalent.

Mosaic

Mosaic is occurring generally but is not reported as being the cause of heavy losses.

Vermont: (Lutman, July 15) Occasionally noted on garden beans and on field beans like Pole Horticultural.

Massachusetts: (Krout, Aug. 15) The usual amount.

West Virginia: (Giddings, Aug. 15) Not observed or reported.

Ohio: (Miss Detmers, Aug. 15) No reports have been received or specimens examined.

Michigan: (Bessey, Aug. 15) Occasional throughout the Lower Peninsula.

(Meckstroth, July 29) Very slight in many fields about Saginaw July 29, but it will have no appreciable effect on the yield.

Wisconsin: (Vaughan, Aug. 15) A small amount of this trouble has been observed.

Tennessee: (Essary, Aug. 15) Mosaic has been observed in a good many fields in different sections of the state. The loss has probably not been heavy.

Texas: (Taubenhaus, July 15) Trace - unimportant.

Idaho: (Hungerford, July 1) Just beginning to make its appearance in commercial fields of beans near Moscow.

TOMATO

Early blight caused by Macrosporium solani

According to collaborators, early blight is causing a dropping of foliage and a rotting of the tomato fruit in Massachusetts. In New Jersey it is very abundant. Essary reports that in Tennessee it was serious in some early tomato fields in the western part of the state and that it is often confused with Septoria disease. It was prevalent in Texas with a loss of about 5%. So far this year it has been scarce in Michigan.

Fusarium wilt caused by Fusarium lycopersici

Wilt is appearing in the northern tomato growing states and seems to be as prevalent as usual. The situations in the states reporting its occurrence can be gathered from the following reports.

New Jersey: (Cook, Aug. 15) Reported from several new localities but I have not as yet had an opportunity to investigate.

Kentucky: (Valleau, Aug. 15) Present in about 25% of fields about Owensboro and Henderson.

Tennessee: (Essary, Aug. 15) There have been reports of serious damage from this disease in all parts of the state; but it was very light in the western tomato sections where it was formerly very serious. Resistant

varieties are being grown extensively, especially the Globe.

Texas: (Taubenhaus, July 15) Prevalent, 10% loss.

Ohio: (Thomas, August 15) Practically all soils where the disease is known to exist in past years have demonstrated its presence this season. Weather conditions have been especially favorable. In some truck sections losses will amount to from 50-75% of the crop.

Michigan: (Bessey, Aug. 15) Has appeared in three or four localities and is causing considerable agitation among growers. Diseased areas small as yet.

(Coons, Aug. 15) Two suspicious cases investigated by Dr. Nelson but evidence not complete to establish case. Selby reports disease in Northern Ohio.

Leaf blight caused by Septoria lycopersici

This disease is very abundant in New Jersey, Kentucky, Tennessee and Texas, and since August 1 is becoming so in Michigan. There is a probable reduction of 25% of the yield in Kentucky in the Henderson and Owensboro fields. In Tennessee there were some instances of considerable damage and in Texas the loss was estimated to have been around 3%.

New Jersey: (Cook, Aug. 15) Very abundant.

Kentucky: (Valleau, Aug. 15) On all tomatoes observed, causing a reduction of probably 25% in yield in Henderson and Owensboro tomato fields.

Tennessee: (Essary, Aug. 15) Septoria leaf blight has been very common in all sections examined. In some instances, considerable damage was done. It is often confused with other diseases.

Texas: (Taubenhaus, July 15) Prevalent, 3% loss.

Ohio: (Thomas, Aug. 15) Only a few cases have been observed.

Michigan: (Bessey, Aug. 15) Since first of August becoming very abundant on unsprayed plants (lower leaves). Beneficial to early tomatoes in some cases, by permitting them to ripen earlier.

(Coons, Aug. 15) Most serious tomato disease this year. Spotting and drying of leaves serious. Spraying showing some value.

Leaf mold caused by Cladosporium fulvum

Ohio: (Thomas, Aug. 15) Leaf mold has been more prevalent this season than normally. Weather conditions, for tomatoes planted in the field have been especially favorable. It has been noticed that the varieties which develop a heavy dense foliage have suffered worst. Actual losses, however, have been far less than that caused by Fusarium wilt.

Other diseases

Sclerotium rolfsii was prevalent in Texas but caused practically no loss.

Blossom drop, due probably to dry weather, was reported from Arizona by J. G. Brown. It was severe in a small field at Dos Cabezas, Cochise County.

Root knot caused by Heterodera radiciicola is serious on tomatoes in Georgia, where plantings have been made in infested soils. Digitized by Google

Rhizopus rot caused by Rhizopus nigricans
 Watery soft rot caused by Sclerotinia sp.
 Blossom end rot (non-parasitic)
 Cat face (non-parasitic)

Table 5. Rots of tomatoes found in shipments and reported by inspectors of the Bureau of Markets during June and July, 1920.

Disease	Origin of shipment	Market where inspected	Percentage of decay	No. of cars	Date
Rhizopus rot	Missouri	Detroit	8-9	1	July 20
		"	8-10	1	July 26
		Cleveland	10	1	July 22
		Buffalo	20-25	1	July 29
	Ohio	Pittsburgh	15	1	July 1
	Texas	"	3-15	6	June 16
		"	"	"	July 17
	"	New York	70	1	July 14
	Unknown	Pittsburgh	18(+F)	1	July 1
		Indianapolis	10(+S+F)	1	July 21
	New York	Pittsburgh	6-14(+F)	1	June 29
		"	8(+F)	1	June 30
Blossom end rot	Louisiana	Memphis	9-11(+S)	1	June 25
Cat face	Louisiana	"	7-9	1	June 25
	Missouri	Cleveland	10-15	1	July 22
Watery soft rot	Tennessee	Jersey City	65-95	1	July 29
F=associated with Fusarium rot					
S= " " Soil " "					

SWEET POTATO

Stem rot caused by Fusarium spp:

Stem rot is somewhat general in the sweet potato growing sections that have reported its occurrence this year. To date no definite reports have been received as to the amount of loss.

New Jersey: (Cook, Aug. 15) Very abundant. The control measures are very satisfactory.

Tennessee: (Essary, Aug. 15) Stem rot has appeared in some sections in western and middle Tennessee, but so far it has caused only slight damage.

Alabama: (Thiel, Aug. 15) Present in several counties. No data on the seriousness of the disease.

Mississippi: (Neal, Aug. 15) Appears to be on the increase in many parts of the state. Reported this season from Lee, Tishomingo, Clark, Harrison,

and Adams counties. No data as to approximate damage.

New Mexico: (Leonian, June 15) *Fusarium* rots of sweet potato are becoming very serious.

California: (Link, March) Sweet potatoes stored in San Fernando Valley showed *Fusarium* dry rot. Losses in pits were very heavy this year.

Foot rot caused by *Plenodomus destruens*

Foot rot has been of slight importance so far this year. Reports from Tennessee and Mississippi state that it has not been observed, and in Alabama only a few inquiries have been received in regard to the disease.

Black rot caused by *Sphaeronema fimbriatum*

It is somewhat early to obtain data as to the extent and seriousness of black rot. It is abundant in New Jersey and is appearing in various sections of Mississippi, where in some of the beds infections ran as high as 60%. The growers in Mississippi and Arkansas have had considerable trouble in securing seed free from black rot. The Nancy Hall variety was especially susceptible in Mississippi.

New Jersey: (Cook, Aug. 15) Very abundant.

Tennessee: (Essary, Aug. 15) Not yet observed. Sweet potatoes have not come on the market to any extent yet. There was a large amount of it last year and it was distributed generally over the state.

Alabama: (Thiel, Aug. 15) Have received a few inquiries. No information on its prevalence.

Mississippi: (Neal, Aug. 15) This is the most serious disease of the sweet potato in Mississippi. Have observed it in various sections of the state this season, especially in the beds, the infections running as high as 60%. It will no doubt show up on the tubers at digging time this fall as well as in storage. It seems that the growers are having difficulty in securing disease free seed, especially in regard to black rot. This disease is very bad on Nancy Hall stock.

Arkansas: (Weekly Crop Notes, Apr. 17) Much difficulty is being met in securing satisfactory sweet potato seed and many growers are not using home-grown seed in an effort to get rid of black rot.

WATERMELON

Anthracnose caused by *Colletotrichum lagenarium*

Watermelon anthracnose has so far been reported only from New Jersey and Mississippi, where it is said not to be especially important, and from Alabama where it is reported to be prevalent and causing losses of 5-15% in some fields.

Inspectors of the Bureau of Markets have reported it in 29 cars examined between June 28 and August 6, as shown in the following table:

Table 6. Percentages of anthracnose of watermelon in shipments from various states as determined by food-products inspectors of the Bureau of Markets (June 28 to August 6, 1920).

Origin of shipment :	Market :	Percentage of anthracnose :	Origin of shipment :	Market :	Percentage of anthracnose :
N. Car. :	Baltimore :	5 :	Georgia :	Baltimore :	10 :
S. Car. :	" :	20 :	" :	Cleveland :	15 :
" :	" :	20 :	" :	" :	Considerable :
" :	" :	6-15 :	" :	" :	(Av. 40) :
" :	" :	20-35 :	Indiana :	Pittsburgh :	2 :
Philadelphia :	2-3 :	(Av. 16) :	Calif. :	Philadelphia :	35 :
Florida :	" :	5 :	Unknown :	" :	5-10 :
" :	" :	15 :	" :	" :	10 :
" :	" :	10 :	" :	" :	10-11 :
Pittsburgh :	4-6 :	" :	" :	" :	15-20 :
Cleveland :	10-12 :	" :	" :	" :	40-50 :
" :	10-15 :	(Av. 10) :	" :	" :	(Av. 18) :
Georgia :	Kansas City :	Some :	" :	" :	" :
" :	" :	5 :	" :	" :	" :
" :	" :	Some :	" :	" :	" :
Kearney :	" :	" :	" :	" :	" :
" :	" :	60 :	" :	" :	" :
" :	" :	85 :	" :	" :	" :
" :	" :	65 :	" :	" :	" :
Total number of cars inspected					394
Total number of cars with anthracnose					29
Average amount of anthracnose					20%

Stem end rot caused by Diplodia sp.

Mississippi and New Mexico are the only states reporting the presence of stem end rot in the field. From Mississippi D. C. Neal reports as follows, August 15:

"Common in many parts of the state and responsible for many inferior melons as a result of decay before reaching market centers. Stem end rot treatment not generally practised this season."

Inspectors of the Bureau of Markets, however, have reported its occurrence in shipments from several southern states. Approximately 394 cars of watermelons have been inspected this year, and stem end rot has been found in 73, inspected between June 28 and August 6. The following table gives the percentages found in individual cars.

Table 7. Percentages of stem end rot of watermelon found in shipments examined at various markets by inspectors of the Bureau of Markets (June 28 to August 6, 1920).

Origin of shipment	Market where inspected	Percentage of stem end rot	Origin of shipment	Market where inspected	Percentage of stem end rot
Maryland	Pittsburgh	30-35	Florida	Cleveland	35
	"		(cont)	"	20-25
North Carolina	Baltimore	12-15		"	20
		5		"	5
		Av. 9		"	20-25
					Av. 15
South Carolina	"	10			
	"	10	Alabama	Kansas City	25
	"	2			
	"	50	Louisiana	Baltimore	5
	Philadelphia	5			
	"	10	Texas	Kansas City	15
	"	30		"	25
		Av. 17		"	30
				"	20-25
Georgia	Kearney	60		"	18-20
	"	10		"	65-75
	"	Cons.		"	20-25
	"	Occ.		"	30
	Baltimore	13		"	20-25
	Cleveland	6-8		"	30-35
	"	Bad		"	20
	Kansas City	8-10		St. Louis	3-5
	"	5-6		Chicago	15-20
	"	5		"	32-35
	"	20		"	5-10
	"	20		Pittsburgh	7-10
	"	15			Av. 24
	"	30-35			
		Av. 18	Unknown	"	30-35
				"	25
Florida	Philadelphia	2-3		Chicago	85-90
	"	10		"	2-4
	"	2		New York	35-40
	"	7		Minneapolis	5-7
	"	20		"	20
	Pittsburgh	3-5		"	23
	"	20-25		"	55
	"	5-8		Philadelphia	10-20
	"	15-20		"	5
	"	25		"	20-22
	"	18-20		"	10-15
	"	20-25			Av. 26
	Washington	10			

Total number of cars inspected 394

" " " " with stem end rot 73

Average amount of stem end rot in 73 cars 20%

CANTALOUPEBacterial wilt caused by Bacillus tracheiphilus

New Jersey: (Cook, Aug. 15) Abundant in many localities.

Ohio: (Thomas, Aug. 15) Numerous specimens have come to us for identification. The bacterial disease seems to be quite widespread and causing more loss this year than usual, always, however, associated with insects which have not been controlled.

Mississippi: (Neal, Aug. 15) Reported from Jones County and also observed in fields here at the experiment station. Damage slight.

Mosaic (cause undetermined)

Michigan: (Bessey, Aug. 15) Apparently very rare. No cases reported to us.

Wisconsin: (Vaughan, Aug. 15) Less than usual. Small amount at Madison and Rockland, Wisconsin.

Anthracnose caused by Colletotrichum lagenarium

Only five states have reported the occurrence of anthracnose. It is apparently causing little damage except locally in West Virginia.

New Jersey: (Cook, Aug. 15) Yes, but we have no records as to its severity.

West Virginia: (Giddings, Aug. 15) Reported from the Ohio Valley as locally destructive.

Tennessee: (Essary, Aug. 15) A few reports of anthracnose have been received but the disease seems to be light so far.

Alabama: (Thiel, Aug. 15). Is no doubt present in many parts of the state, but no reports have been received this season.

Mississippi: (Neal, Aug. 15) Is no doubt present in many parts of the state, but no reports have been received this season.

FRUITSPEACHLeaf curl caused by Exoascus deformans

The accompanying delayed reports on occurrence of leaf curl have been received since the last summary for that disease was made (Pl. Dis. Bul. 4:17-19, July 15, 1920).

Pennsylvania: (Thurston, July 1) First observed in York and Lancaster Counties May 14. Appears to be general throughout the state. Reported on all varieties.

Indiana: (Gardner, July 1) Especially bad in Indiana this spring, and widely prevalent. Loss of half of the crop was caused in one forty-acre orchard because the owner failed to spray this year. The loss was due not only to defoliation, but to direct attacks upon the small fruits. Champion and Hale more resistant than Elberta and Big Red.

Michigan: (Coons, Aug. 15) Crop good everywhere, curl not mentioned as a factor. Any defoliation has largely been outgrown.

Kentucky: (Valleau, July 15) Present in all orchards inspected. Not entirely controlled by dormant spray of copper sulphate.

Tennessee: (Hesler, July 15) Very generally troublesome this spring. In most cases spraying was done too late.

Arkansas: (Rosen, July 15) Common where dormant spray was not applied.

Brown rot caused by Sclerotinia cinerea

Table 8. Percentages of brown rot in carload shipments of peaches examined at various markets by food products inspectors of the Bureau of Markets (July 6 to August 12, 1920).

Percentage of:				Percentage of:			
Origin of:Market where:		decay		Origin of:Market where:		decay	
shipment	inspected	in two:	in	shipment	inspected	in two:	in
		lower	upper			lower	upper
		layers:	layer			layers	layer
Del.	Philadelphia	10-20	(Av.)	Ga.	Philadelphia	10-20	75-80
	Pittsburgh	Occasional			"	5-10	15-25
	Washington	5-30	50-60		"	15-20	75-85
Md.	Pittsburgh	2	(Av.)		"	5-15	25-40
W. Va.	"	t			"	5-10	5-15
	"	5-8	15-20		"	5-15	(Av.)
	"	2-	8-10		"	0-6	3-6
N. Car.	New York	25	(Av.)		"	4	5-10
	Philadelphia	5-10	15-30		"	5-15	25-35
	"	0-5	10-20		Pittsburgh	5-20	(Av.)
	"	10-20	20-30		"	10	(Av.)
	Cincinnati	t-15	50-60		"	5-10	50
Ga.	St. Louis	0	2-4		"	10	30
	Chicago	15-20	35-45		"	3-15	25-30
	Philadelphia	5-10	15-25		"	3-5	25-30
	"	3-5	15-25		"	2-4	25-30
	"	10-15	50-70		"	15-50	70-75
	"	0-20	5-10		"	3	20
	"	0	3-5		"	5-30	30
	"	30-50	(Av.)		Cleveland	10-15	(Av.)
	"	5	15-20		Indianapolis	15	(Av.)
	"	2	15	Tenn.	Chicago	0-4	20-25
	"	0-5	5-10	Mo.	Indianapolis	10-15	(Av.)
	"	10-20	80-90	Texas	Kansas City	12-15	(Av.)
	"	5-10	15-25	Ark.	"	10-20	35-40
	"	3-8	5-10		Average	6-13	22-29
					Total No. cars with brown rot		51

Fifty-one cars of peaches examined by inspectors of the Bureau of Markets showed brown rot in varying amounts. Of these shipments 49 were inspected between July 28 and August 12; the other two (Georgia peaches inspected at Pittsburgh) were examined on July 6 and July 13. The percentages found in individual cars are given in Table 8.

It will be noted from the above table that the percentage of brown rot is always greater in the upper layer of baskets than in the lower layers. This is due to higher temperatures obtaining at the top of the load as shown by many tests made by inspectors. The baskets in the cars listed above were loaded 3-5 layers deep.

Additional reports of the occurrence of brown rot have been received from collaborators in the following states:

New York: (Department of Plant Pathology, Aug. 15) There was considerable blossom blight reported in some localized areas. No infections of important proportions have yet been noted on the fruits. A large number of growers in Western New York are dusting and spraying peaches this year.

Pennsylvania: (Thurston, Aug. 1) First infections reported from York, Dauphin and Huntingdon Counties May 25. Reported 100% in one orchard in Cumberland County July 20. Damage will be great.

Indiana: (Gardner, August 15) Not a serious factor in the Indiana crop. Very little noted in the orchards.

Kentucky: (Valleau, July 15) Slight amount of blossom blight. Rotting of fruit just beginning with ripening. Not serious because of dry weather.

Tennessee: (Heeler, July 15) General throughout the state but in most cases not yet destructive. In one large orchard, however, (300 acres) twig blight and fruit rot were abundant on Elberta on May 26.

PEAR

Fire blight caused by Bacillus amylovorus

Reports from West Virginia, Virginia, Kentucky, Tennessee, Texas and Arkansas indicate that fire blight is severe within those states. In New Mexico it is slight, although it was severe the past year.

West Virginia: (Sheldon, July 4) Scattering trees in the vicinity of Morgantown are seriously injured, others but slightly. Rapid development since recent rains.

Virginia: (Fromme, Aug. 1) Especially severe this year in southwestern part of state.

Kentucky: (Valleau, Aug. 1) All pear trees observed badly blighted.

Tennessee: (Heeler, July 15) It is commonly taken for granted in Tennessee that blight has driven the commercial pear out of the state during the last several years. There are very few trees, except an occasional one or two in backyards, in the state. On these, twig blight, blossom-blight and "holdover" cankers are the chief forms of the disease. The main problem of blight on pears seems to be that of the pear acting as host for hibernation of bacteria which infect adjacent apple orchards. Twig blight on apples was abundant this year.

Texas: (Taubenhaus, Aug. 1) Prevalent, 5% loss.

Arkansas: (Rosen, Aug. 1) Hardly a tree to be found in the state without some blight. In the apple section farmers are cutting down the pear trees to

save the apple trees from blighting.

New Mexico: (Leonian, Aug. 1) Slight, in spite of the fact that it was very severe the past year and many of the old cankers were left upon the trees and are still active during the present season.

(June 15) Strange to say, the pear blight has not manifested itself in spite of last year's heavy outbreak. Our very dry spring this year is held responsible for this.

Other Diseases

Ozonium omnivorum is prevalent in Texas according to the report from that state.

Phoma ambigua in New Mexico is local and the severity is very slight, according to report of L. H. Leonian on Aug. 1.

Chlorosis in New Mexico is quite prevalent according to the collaborator's report.

PLUM

Brown rot caused by Sclerotinia cinerea

The accompanying reports indicate that brown rot is abundant this year at least in the humid eastern states.

Massachusetts: (Krout, Aug. 1) Prevalent throughout the state.

New York: (Department of Plant Pathology, Ithaca, Aug. 1) Brown rot began to appear on plum fruits several weeks ago. It has spread only slightly in most cases.

New Jersey: (Cook, Aug. 1) Very abundant.

Ohio: (Thomas, Aug. 1) Numerous specimens have been received from all parts of the state, which lead us to believe that the disease is very widespread this year. Where no precautions have been taken to check the progress of the fungus by treatments, entire crop of some trees has been lost. Weather conditions are thought to be responsible for the general prevalence of the disease.

Wisconsin: (Vaughan, Aug. 1) General but in small amounts only. Dry weather is holding this disease in check.

Minnesota: (Stakman, Aug. 1) Blossom blight was first reported May 27. It was fairly common and did some damage. The weather during the early summer was favorable for the development of the disease. During July, however, the weather has been very unfavorable and not much of the disease has appeared on the fruit. However, it has been reported as fairly common on Compass cherry and plums. The first report on fruit was June 10. Shortly after it was reported as being very abundant on plums in Morrison County.

Kentucky: (Valleau, Aug. 1) Slight amount of blossom blight. Fruit showing some rotting following rain but not serious as yet.

Tennessee: (Hesler, July 15) Common wherever fruit is found. Plums not grown commercially.

Texas: (Taubenhaus, Aug. 1) Prevalent. 10% loss.

Oklahoma: (Learn, Aug. 1) Not a report received regarding a plum disease.

Arkansas: (Rosen, Aug. 1) Common and abundant on unsprayed trees.

Plum pockets caused by Exoascus pruni

The abundance of plum pockets this year in Ohio and Michigan is somewhat unusual. Apparently the weather in those states was especially favorable this season. This disease is usually common in Minnesota.

An examination of past reports of this disease will show that it is sporadic in occurrence, showing up in a locality one year and entirely absent the next. It is suggested collaborators get as much data as possible on the range of this disease in order to provide a basis for the study of weather relations.

Ohio: (Thomas, Aug. 1) Five specimens have been received for identification.

Michigan: (Coons, July 1) Several communities have sent in reports of plum pockets as being severe.

Minnesota: (Stakman, Aug. 1) Plum pocket was fairly abundant and did considerable damage. The first report was June 14.

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UNITED STATES DEPARTMENT OF AGRICULTURE**

THE PLANT DISEASE BULLETIN

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THE PLANT DISEASE SURVEY

Vol. IV

Number 5

Diseases of corn, flax, potato, bean, cotton,
tobacco, and apple are reported in this issue

The summaries on diseases of flax and tobacco are of especial interest as they contain reports from crop specialists from the Cereal and Tobacco Offices of the Bureau of Plant Industry.

Tobacco leaf spot diseases seem to be particularly prevalent this season.

Physoderma on corn has been found in new sections of Indiana and Nebraska this season. The occurrences in both states have extended the known geographical range as they are somewhat beyond the previous outer limits.

Potato late blight is progressing in the northeast. (See reports and map; pages 72-74.)

CEREALSCORNSmut caused by Ustilago zeae

Corn smut has been reported on sweet corn in Massachusetts, New Jersey, Virginia, Georgia, Ohio, Minnesota, Louisiana, and Mississippi. In most cases it is present in about the usual amounts or less, and is causing only slight damage. In New Jersey, however, it is said to be the cause of many complaints; and Ohio reports more than the normal amount, although rarely injurious. This is said to be due probably to almost continuous wet weather. In South Dakota and Southeastern Wyoming the disease is occurring, in most cases slightly, according to reports from Arthur T. Evans and H. G. Macmillan, respectively.

Sharon, North Dakota, and Moccasin and Havre, Montana. He summarizes his findings as follows (Cereal Courier 12:276, Aug. 20):

"Flax wilt was found as far west as Dickinson, N. D., Williston, N. D., and Plentywood, Mont. At Plentywood infection in one field was 10%. At Dickinson infection was very slight and farther west at Moccasin and Havre, Mont., no wilt was found in any of the fields visited. There was no wilt at Moccasin where land had been sown to flax continuously for the last five years."

The variety NDR 114 continues to show resistance to wilt, according to A. G. Johnson (July 27).

Michigan: A trace of wilt was found in the fiber flax plots of Mr. R. L. Davis. Less than 1% wilt was found at Crosswell, Michigan, at this time.

On a later trip to Michigan, July 24-26, a number of fields of fiber flax at Yale were free from disease. One field noted in one corner of which 50% of the plants were wilted; another showed 20-50% wilt at various places; one other field at Yale showed 1% wilt. A field at Peck showed as high as 7% wilt in some spots, but probably averaged less than 1%. A trace of wilt was found at Crosswell. A number of fields around Applegate showed about 1% wilt. (Chas. S. Reddy, Aug. 5)

Minnesota: General all over the flax growing section of the state. Varying in severity from a trace to 90% loss, averaging, perhaps, around 12 or 14%. First report May 23. (Leach, Sept. 1)

Rust caused by Melampsora lini

No rust was found in Montana or in western North Dakota during Mr. Brentzel's survey for flax diseases. It has been reported from Minnesota and Eastern North Dakota, however.

The following report from Mr. Brentzel gives a summary of the findings of rust (Cereal Courier 12:276, Aug. 20):

"Flax rust was noted as to occurrence and severity. No rust was found west of Dickinson, North Dakota. All fields visited in Western North Dakota and Montana were free from rust. Infection was severe in eastern North Dakota, running as high as 100% in some fields examined. All fields visited in the Red River Valley were infected to a greater or less degree depending considerably upon the variety of flax grown."

Minnesota: Not very prevalent. Reported from Red River Valley. (Sept. 1, Leach)

North Dakota: Flax rust appeared June 7. Some varieties are more severely attacked than others though none is suffering much injury as yet. (Brentzel, Cereal Courier 12: 207, July 10)

Canker (non-parasitic)

Data from Mr. Brentzel's report indicate that canker is generally distributed in Western Minnesota, North Dakota and Montana, though much more severe

in the last named state. The disease was also reported as causing very slight damage in Hyde County, South Dakota, by A. T. Evans (Aug. 13).

Investigations conducted at the State Experiment Station at Fargo, North Dakota, show that "excessive heating of the surface soil by the hot sun will injure the plants at the soil line and cause canker." (W. E. Brentzel, Cereal Courier 12: 207, July 10).

The following is a summary of conditions in Minnesota, North Dakota and Montana by W. E. Brentzel (Cereal Courier 12: 276. Aug. 20):

"Flax canker, while apparently very much more severe in Montana, was found at all points visited, the damage in commercial fields in eastern North Dakota being slight, while at Dickinson and Williston, North Dakota, and Plentywood, Montana, the damage ran from moderate at Dickinson, more severe at Williston, and as much as 10% or more at Plentywood. Farther west at Moccasin and vicinity the damage was about 25% and at Havre as high as 50% or more in one large commercial field examined."

Anthracnose caused by *Colletotrichum lini*

The occurrence of anthracnose on fiber flax in Michigan was reported by C. S. Reddy as follows (Aug. 5):

"On June 16 at East Lansing anthracnose was noted ranging from less than 1% in some plots to more than 60% in others. In many cases the anthracnose was producing a type of canker. In two fields belonging to the American Company at Yale, Michigan, less than 1% anthracnose was noted. Five percent was found in one field near Peck."

VEGETABLES AND FIELD CROPS

POTATO

Late blight caused by *Phytophthora infestans*

Since the last report in the Plant Disease Bulletin of the occurrence of late blight, the disease has progressed markedly on the late crop in the states from which it has been reported and has been noted in several localities in Ohio. It now appears that the disease is general on the foliage in Aroostook County, Maine, the greater part of Vermont, Western Massachusetts, New York, New Jersey (on the eastern side especially), Pennsylvania and parts of Maryland and West Virginia.

The accompanying map shows counties where blight has actually been located and

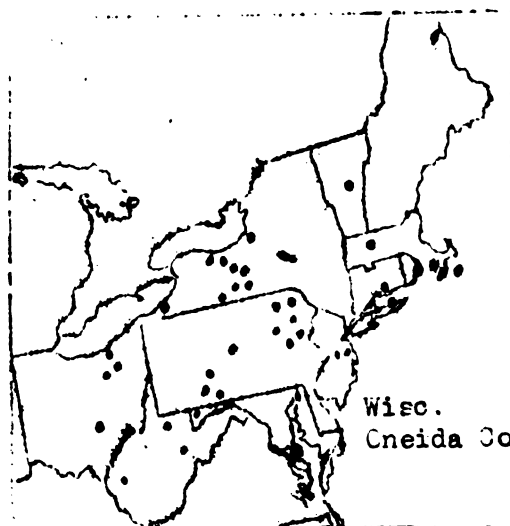


Fig. 2. Occurrence of potato late blight, 1920. Each dot represents a county.

reported to the Survey, but of course the disease is much more widespread within the area than the map would indicate.

Vermont: Mr. Gilbert reports a general outbreak after Aug. 15, which includes practically all the state except regions in the Champlain Valley.
(Lutman, Aug. 15)

Massachusetts: First reported Aug. 9. Very severe in the western part of the state. (Kroust, Sept. 1)

New York: Reported first up-state in Monroe County Aug. 2. Since then it has been observed in Oswego, Seneca, Otsego, Allegany, Chautauqua, Tompkins, Genesee, Steuben and Tioga Counties. In some fields the vines are nearly all dead, although few reports have been received of rotting tubers.
(Chupp, Aug. 1)

New Jersey: Appeared early in July and widely distributed throughout the state. Very severe and the cause of heavy losses in Monmouth County, but gradually diminishing westward. The losses in Mercer and Middlesex were slight. Practically no loss in other parts of the state. (Cook, Sept. 1)

While at Redbank, New Jersey, on Aug. 17, I found the digging of potatoes practically suspended on account of the prolonged wet weather. In some fields, where digging was under way, farmers were discarding many potatoes, owing to the fact that soft rot has followed late blight injury. The wet type of *Fusarium* rot is also much in evidence. Late blight is apparently widely distributed in the state this year. Mr. Ellwood Douglass, county agent of Monmouth County, reports 20-65% late blight dry rot in fields where the foliage was severely affected. The farmers are taking great pains to cull out all stock that shows initial stages of attack. (F. C. Meier, Aug. 26)

Pennsylvania: Rain has caused considerable blight and rot, particularly on ground. (Weekly Crop Notes*, Sept. 2)

Potato blight increasing and considerable rot reported from southeastern counties. (Nat. Weather and Crop Bul., Sept. 1)

Epidemic throughout the state. Reported even from Adams County, which is quite unusual. All but best sprayed fields are dying or dead. Tubers rotting. Loss promises to be heavy. (Thurston, Sept. 1)

Delaware: Good crop of Irish potatoes expected. Some slight blight reported where rains have been excessive and there are some complaints of rotting.
(Weekly Crop Notes*, Sept. 2)

Maryland: Too much rain for Irish potatoes; blight and rot is reported in some sections but crop is still promising. (Weekly Crop Notes*, Sept. 2)

West Virginia: Occasional blight reported but condition excellent as a whole.
(Weekly Crop Notes*, Aug. 19)

Ohio: Miss Detmers made the first collection for the season of potato late blight, *Phytophthora infestans*, in the Station plots at Wooster, Aug. 23, 1920. Subsequently numerous collections were made in surrounding district. Considering the character of the season the appearance of late blight is later than anticipated. In 1915 the first collection was made Aug. 9, while in 1917 it was found July 24. (Selby, Sept. 1)

Its presence was discovered Aug. 23 on the Station farm and in Wooster gardens. Later specimens have been received from Muskingum County. We apprehend that it is widespread and may severely affect the late potato

crop, as the cool, wet weather is favorable to its dissemination. (Miss Detmers, Sept. 1)

Early blight caused by Macrosporium solani

The following reports further indicate sub-normal amounts of early blight:

Massachusetts: Prevalent but causing no serious loss. (Krout, Sept. 1)

Pennsylvania: Reported as damaging in southern counties. (Thurston, Sept. 1)

New Jersey: Widely distributed throughout the state but less severe than usual. (Cook, Sept. 1)

Ohio: In many localities none has appeared, and wherever it has been found it was a very light attack. (Miss Detmers, Sept. 1)

Minnesota: Generally distributed over the state. Light to moderate infection. Earliest report July 7. (Leach, Sept. 1)

Nebraska: Early blight present in varying amounts throughout the state. Damage of no practical importance. (Goss, Sept. 1)

Wyoming: Maturing varieties as Triumph and Ohio badly attacked. Plants too mature to cause much damage. Trace on Kings and Cobblers. (MacMillan, August)

Oregon: Some along the coast but damage slight. (Barss, Sept. 1)

In few fields unfavorably situated, that is, with too much soil moisture. Damage slight. Multnomah County. (McKay, Sept. 1)

Fusarium wilt caused by Fusarium oxysporum

Fusarium wilt is reported very prevalent on late potatoes in Indiana where it is by all means the worst fungous disease of the crop. In the Red River Valley of Minnesota, Mr. Shapovalov, of the Office of Cotton, Truck and Forage Crop Disease Investigations, found wilt to be common and in many cases associated and complicated with black leg.

In Nebraska the disease is found in varying amounts in practically all fields. Colorado is not experiencing the losses this year from Fusarium wilt as is often the case.

Leaf roll (cause undetermined)

Leaf roll is prevalent in certain northeastern states as shown by the following reports. (See also Pennsylvania report, Pl. Dis. Bul. 4: 56, 1920)

Massachusetts: Present in small amounts in most of the fields examined. (Krout, Sept. 1)

New York: Leaf roll was reported first, June 28 from Albany, Orleans and Steuben Counties. It is found in nearly every field where potatoes are grown, especially on the "Rural" type. Great effort has been made by many growers in obtaining disease-free stock, either by purchasing seed which had been inspected, or by means of separate seed plots, and elimination of the diseased hills as soon as they appear. There are a few "Rural" strains that are almost free from leaf roll. (Chupp, Aug. 1)

New Jersey: Very common on Cobblers. Much more abundant than usual. Symptoms

very prominent in early part of the season but much less prominent later.
(Cook, Sept. 1)

Minnesota: Not very prevalent; of little importance. (Leach, Sept. 1)

Nebraska: Leaf roll plants in a few fields in the western part of the state.
(Goss, Sept. 1)

Mosaic (cause unknown)

Pennsylvania: Reported locally from Centre and Luzerne Counties. Known to be quite general throughout the state, though definite reports for this season are not at hand. (Thurston, Aug. 1)

New Jersey: Variable, depending on source of seed. (Cook, Sept. 1)

Georgia: Observed on 90% of the Red Bliss planted as a spring crop. Also observed on Green Mountains. Cobblers, Early Ohios and Early Rose were free from mosaic in the spring crop. (McClintock, Aug. 1)

Minnesota: Northwestern Minnesota seems to have the same problems as Northern Wisconsin, mosaic being their main problem. I saw also one excellent field of Green Mountains showing less than 1% of distinct mosaic. At Bemidji mosaic was also present. (H. Shapovalov, News Notes of the Office of Cotton, Truck and Forage Crop Disease Investigations, Aug. 28)

Mosaic very prevalent. Extremely destructive on Triumphs. Green Mountain variety also rather heavily infected. (Leach, Sept. 1)

Nebraska: Mosaic present in practically all fields of Triumph potatoes. Both on the irrigated and dry land. Fields from carefully selected local seed are either free from the disease in most cases or only a trace of mosaic present. Fields planted with the ordinary commercial seed show a large percentage of infection. Other varieties of potatoes show much smaller amount of mosaic. (Goss, Sept. 1)

Nevada: The disease is found in various parts of the state, but the loss is very slight. (Lantz, Aug. 1)

Oregon: Occurs widely in many fields. Generally not more than 2%. Damage slight. (McKay, Sept. 1)

Other diseases

Rhizoctonia is reported by McKay from Oregon, Sept. 1, as being widespread in the western part, causing in combination with the hot, dry weather of August, the premature death of 10-30% of the plants. Very bad where rotation is not properly used.

Wilt, caused by Verticillium albo-atrum is reported by McKay, Sept. 1, as being present in western Oregon in about the usual amounts where ordinary seed potatoes or improper rotations are used.

BEAN

Blight caused by Bacterium phaseoli

Reports from New York, Indiana and Minnesota show that bacterial blight is as destructive in those states, as in others from which reports have been received previously.

New York: The most common of the bean diseases at present. Found in practically every dry and snap-bean field. No resistant varieties have yet been developed. First reported in Albany County, July 6. (Chupp, Aug. 15)

Indiana: Extremely destructive. (Gardner, Aug. 15)

Michigan: Blight seems to be the prevalent disease of beans in Michigan this year. On account of the blight, bean production may be below normal. Three weeks ago the crop was reported to be above normal, but the blight has cut this estimate down considerably. (O. F. Burger in News Notes of the Office of Cotton, Truck and Forage Crop Disease Investigations, Aug. 28)

Minnesota: Abundant during July and August. Generally present in varying amounts. Only a trace in some fields, others showing as high as 80% infection at an estimated loss of 25%. (Leach, Sept. 1)

Anthracnose caused by Colletotrichum lindemuthianum

In New York and Pennsylvania anthracnose is apparently causing somewhat more loss than in most of the states previously reporting the disease.

New York: Common and very destructive in some snap-bean fields. Most of the dry bean growers have either changed to other crops, or are growing strains which have proved resistant to one or both strains of the fungus. Well's Red Kidney is one of these resistant strains.

Pennsylvania: Losses of 5-25% reported. (Thurston, Aug. 15)

Minnesota: Very abundant during early July. Some fields suffering 5-10% loss. Rather scarce during later July and August, due to extreme drought. First report July 4. (Leach, Sept. 1)

Rust caused by Uromyces appendiculatus

Additional reports of the occurrence of rust have been received from New York, Pennsylvania and Minnesota. In no case was it said to be causing appreciable damage.

Mosaic (cause undetermined)

New York: A large number of growers who have had serious losses due to mosaic have either quit growing beans or are planting the "Michigan Robust strain". Other varieties are being bred for mosaic resistance. (Chupp, Aug. 15)

Pennsylvania: Reported as common in Luzerne and Northampton Counties. (Thurston, Aug. 15)

Georgia: Less than 1% on string or snap beans. (McClintock, Aug. 15)

Indiana: Not serious. (Gardner, Aug. 15)

Michigan: The mosaic is doing a great deal of damage, although the blight seems to be the problem this year. (Burger, News Notes of the Office of Cotton, Truck and Forage Crop Disease Investigations.)

Minnesota: Mosaic abundant, varying in severity. Some

varieties showed as high as 10% loss. Others showed higher percentage of infection with mild form, causing but slight injury. First report June 1. (Leach, Sept. 1).

Oregon: General and widely distributed. In many fields a very high percentage of diseased plants, often close to 90 or 100 percent. Fields showing no trace of mosaic are rare. (Barss, Sept. 1).

Mildew caused by Phytophthora phaseoli

Mildew is reported as serious on lima beans in Greene, Philadelphia and Delaware Counties, Pennsylvania. (Thurston, Aug. 15).

COTTON

Fusarium wilt caused by Fusarium vasinfectum

Wilt is causing serious damage again this year on many sandy soils in the South, where non-resistant varieties are planted. In addition to the following states, Oklahoma has experienced losses from the disease, but apparently not of a serious nature.

Georgia: None observed to date. Largely controlled in this state through the planting of wilt resistant varieties. (McClintock, Sept. 1).

Alabama: Wilt is very bad in Alabama this year. From one-fourth to one-half of the plants in the fields in some counties are affected. (Thiel, Sept. 1).

Mississippi: Present in many parts of the state, especially in the sandy loam soils, where wilt resistant varieties are not planted. Loss serious in many parts of the state. (Neal, Sept. 1).

Louisiana: Heavy infection in some parts of the state. (Edgerton, Sept. 1).

Arkansas: Scattered over a large part of the state. Severe in some places. (Elliott, Sept. 1).

Root knot caused by Heterodera radicicola.

Georgia: Serious where cotton is planted on heavily infested soil. One hundred per cent infestation in such soil. (McClintock, Sept. 1).

Mississippi: Very little root knot has been observed this season. It was found in one field near Agricultural College, Mississippi. (Neal, Sept. 1).

Louisiana: Of minor importance in this state. (Edgerton, Sept. 1).

Arkansas: Bad in some sandy lands. Probably causes more damage than is commonly known. (Elliott, Sept. 1).

Anthracnose caused by Colletotrichum gossypii

Georgia: Very small percentage observed on the cotton seen in middle Georgia, probably due to dry weather early in the season. (McClintock, Sept. 1).

- Alabama: Present in the state. No data on damage. (Thiel, Sept. 1).
Mississippi: Reported from a few counties in the Delta. Apparently of little importance this season. (Neal, Sept. 1).
Louisiana: Infection rather heavy this year. This is due to the very heavy rainfall of the past six weeks. (Edgerton, Sept. 1).
Oklahoma: There are reports of cotton anthracnose and shedding of lower leaves. (Weekly Crop Notes, Aug. 26, 1920:4).
Arkansas: Severe in some places but not generally distributed. (Elliott, Sept. 1).

Angular leaf spot and boll rot caused by Bacterium malvacearum

General in Alabama, Mississippi, Louisiana, Texas and Arkansas and local in Oklahoma. In Arkansas it is reported as the most serious disease in the state. In Louisiana it has been less serious this year than in former years. A considerable amount of boll rot was reported from Texas, due to the excessive moisture, low temperature and lack of sunshine. There were scattered instances in Oklahoma due to the same weather factors as in Texas.

- Alabama: Quite general throughout the state. Inquiries received from various sources indicate that the disease is quite common. (Thiel, Sept. 1).
Mississippi: Present in many parts of the state, but never causes any serious injury. (Neal, Sept. 1).
Louisiana: Present in all sections, but apparently not doing as much damage as in some other years. (Edgerton, Sept. 1).
Oklahoma: There are a few reports of angular leaf spot in various sections, but no serious damage. (Weekly Crop Notes, Aug. 19).
Arkansas: Very severe in eastern part of the state in June. Many plants killed. (Elliott, July 1).
 Common, widely spread and most serious disease of the state. Very severe on bottom lands early in the year. Becoming severe again now. (Elliott, Sept. 1).

Malnutrition (non-parasitic)

Malnutrition has played a considerable part in reducing the yield of cotton this year. Reports from Florida and South Carolina also indicate deterioration from "rust" as it is called by the growers.

- Georgia: None observed or reported to date. Have not observed it since 1918, probably due to farmers using more potash in their fertilizer. (McClintock, Sept. 1).
Louisiana: Have received no complaints. This trouble is very seldom present to any serious extent except in dry seasons. (Edgerton, Sept. 1).
Mississippi: Potash hunger present in many parts of the state. In many fields defoliation was complete by the middle of August. Yields, however, do not appear to be materially reduced. This trouble seems to hasten maturity. (Neal, Sept. 1).
Arkansas: Common on some of the coarser sand lands and other poor soils. (Elliott, Sept. 1).

Other Diseases

Fusarium rots of cotton caused by Fusarium sp. are becoming very serious in New Mexico. (Leonian, June 15)

Black boll, caused by Diplodia gossypina, is causing considerable loss this season in Louisiana, due to the heavy rainfall. (Edgerton, Sept. 1)

TOBACCO

According to W. W. Garner, Office Tobacco Investigations, Bureau of Plant Industry, the outstanding feature in the tobacco disease situation this year has been the unusually large number of leaf spot diseases reported from the various commercial sections, doubtless because of the prevailing wet weather.

Wild-fire caused by Bacterium tabacum

Wild-fire is reported this season from Massachusetts, Connecticut, Maryland, Virginia, Kentucky, and Tennessee. It is interesting to note that this is a new disease for Massachusetts.

Massachusetts: Observed this year in three localities in Massachusetts for first time. Reported to have occurred last year in at least one field. Damage as yet very slight. (G. H. Chapman, Sept. 1)

Connecticut: On my trip to the Connecticut Valley last week (Sept. 1st), several instances of the appearance of wild-fire in the tobacco seed beds in Hartford County were brought to my attention and in one case in the vicinity of Granby the disease persisted until the tobacco had been harvested. (Garner, Sept. 9)

Maryland: Wild-fire appeared in seed beds in Charles and Prince George Counties, and in some instances has caused serious damage to the crop in the fields in these counties. Also reported from Bristol, Ann Arundel County, August 31. (Garner, Sept. 9)

Kentucky: Present in 50% of the fields of Burley so far examined. Very destructive in some fields, especially in the smaller tobacco. A disease of dark tobacco resembling wild-fire is causing severe losses in the western tobacco sections. This is being studied to determine its relation to the Burley diseases. (Valleu, Sept. 1)

Angular leaf spot caused by Bacterium angulatum

This leaf spot was reported from Virginia and Kentucky in an earlier number of the Plant Disease Bulletin (4 : 52, Aug. 15, 1920). Another report, showing the seriousness of the disease in Kentucky, has been received recently.

Kentucky: Present in all fields of Burley so far examined, causing very extensive injury. Spreading very rapidly because of excessive rains. Loss from wild-fire and angular leaf spot will probably amount to 40% of crop. (Valleu, Sept. 1)

Root rot caused by Thielavia basicola

Massachusetts: Severe and general earlier in season, but fields have at present outgrown it to a large extent. (G. H. Chapman, Sept. 1).

Maryland: Marlboro, Prince Co. Maryland. Considerable root rot observed in the fields beyond Washington, D. C. (Garner, Sept. 9).

Virginia: Charlotte Court House, Charlotte Co. Stated to have caused considerable loss in several fields scattered throughout Charlotte County. (Wilson, Sept. 9).

Kentucky: Found in about 90% of Burley tobacco fields examined. One severe case of root rot in dark tobacco was seen at Henderson. (Valleau, Sept. 1).

In the White Burley District of Kentucky and Ohio the season seems to have been exceptionally favorable for the development of Thielavia root rot in all sections visited. (C. M. Slagg, Office of Tobacco Investigations, Sept. 9).

Ohio: In Germantown and Miami Valley root rot has been very prevalent this season, being surpassed in severity only by the outbreaks of 1915 and 1918. This disease in conjunction with a late spring made transplanting unusually late for growers whose beds were not sterilized. Up to about the beginning of the second week of August the disease was very noticeable and widespread, especially upon the heavier types of soils and in areas with defective drainage, but the dry weather during the latter half of July and the first few days of August allowed the soil temperature, except on very poorly drained areas, to rise sufficiently for the plants to at least partially recover and throw out new roots with the result that rapid growth followed the timely rains that have fallen since early August, and though rather late, an average crop is indicated on fertile well drained soil. As usual the root rot is much worse on clover sod land than where tobacco follows other crops. Limited observation would indicate corn is one of the best crops to precede tobacco so far as prevention of root rot is concerned. (Houser, Sept. 1).

Mosaic (cause undetermined)

Massachusetts: Only a small amount as compared with total acreage. A few small and locally heavy infections. Less than usual. (Chapman, Sept. 1).

Ohio: In Germantown and Miami Valley mosaic disease is more prevalent than usual through there having been several worse outbreaks within the last 15 years. In general those growers who have steamed their beds are but little troubled with mosaic this year. The disease, if present at all, being mostly confined to a few spots, while fields set with plants from unsteamed beds are apt to have a large percentage of mosaic over the whole area. Where poultry had access to fields containing diseased plants early in the season, it is a common occurrence to find practically all of the plants diseased in the places where fowls ran over the leaves, thus transferring the disease from plant to plant. Owing to weather conditions the stunting effect and premature blooming and ripening of tobacco affected with mosaic is much more pronounced than usual and for this reason the loss from this disease will be unusually heavy. (Houser, Sept. 1).

Kentucky: Present in most fields in much greater abundance than usual, especially in late plantings from beds picked over one or more times. (Valleau, Sept. 1).

Other diseases

Rust (cause undetermined) - The so called "rust" disease is reported in Pennsylvania, Kentucky, Tennessee, and Ohio. Mr. Otto Olson of the Office of Tobacco Investigations reports "an alarming outbreak of rust which had started was checked by dry weather, in Lancaster County, Pennsylvania." Mr. True Houser reports the disease from the Miami Valley and the vicinity of Germantown, Ohio, as follows:

"Considerable in bottom lands where the gravel lies close to the surface, some plants being out green on account of rust. Whether or not the loss from rust will be important will depend upon the weather during September. Rust seems to attack mosaic plants more readily than others."

Crook neck (so-called) has appeared in several sections of the state of Kentucky. It makes its first appearance closely following severe electrical storms and is considered by many growers to be lightning injury. In one field where lightning struck several times during a storm, injured areas about 40 feet in diameter were found the following day.

Hollow stalk caused by bacterial soft rot - Massachusetts: Occurs occasionally this season particularly on Broadleaf. More than usual. Increase probably due to continued wet weather after topping. (G. H. Chapman, Sept. 1).

Dead spot - A trouble designated as dead spot is reported through the Office of Tobacco Investigations from Chesterfield and Spottsylvania Counties, Virginia, August 11 and 16 respectively.

Yellow French - Ohio (Germantown and Miami Valley): Not abundant. Have observed it only in a few spots where it nearly always appears. (True Houser, Sept. 1).

Rosette disease - Ohio (Germantown and Miami Valley): Rosette disease is more abundant than usual. In other years examination of the roots usually has shown infestation by nematodes and a large proportion having root rot also. Many of the plants with rosette disease are also mosaic. (True Houser, Sept 1)

FRUITS

APPLE

Scab caused by Venturia inaequalis

Scab is bad on unsprayed or poorly sprayed susceptible varieties in the New England, North Atlantic and Ohio Valley states this year. Apparently the disease is considerably less serious in the Appalachian Fruit Belt and Piedmont Plateau than last year, when it was epidemic in those sections. Indications are that about normal amounts are present west of the Mississippi River, except in Oregon and Washington, where it is somewhat more prevalent, especially in the western sections.

Vermont: Occasional only. Around Burlington much worse than last year; rainy

weather in early May and late June seems to be the cause. (Lutman, July 15).

Massachusetts: Very abundant throughout the state on the susceptible varieties.

Weather conditions have been favorable. (Krout, Sept. 1)

New Jersey: Widely distributed but in most cases not severe. (Cook, Sept. 1)

Pennsylvania: First reported on May 14 from York County. Prevalent throughout the state. Losses of 5-10% common. Transparent (sprayed trees) showing 5% at State College and promises to be fully as bad as last year. (Thurston, July 1).

Virginia: The commercial crop as a whole is very much better as regards scab infection than last year. Scab is very severe, however, in home orchards and in those which did not receive proper spraying. (Fromme, Sept 1)

West Virginia: Very general throughout the state, causing a large amount of foliage injury and serious fruit injury in some orchards. Well controlled by Bordeaux; fairly well controlled by lime-sulphur; and well controlled by certain dust applications. (Giddings, July 1)

Ohio: Has been very general and severe on both fruit and foliage. Probably not as severe epidemic since 1916. The condition for 1919 was that of extreme prevalence upon foliage especially on susceptible varieties in the southern half of the state. The prevailing excessive humidity and sub-normal temperature during the season of 1920 has led to fullest growth of the fungus. Good fruit conditions are generally reported where a pre-blossom spray of Bordeaux mixture was applied; favorable report is made in one or more cases from pre-blossom spray of lime-sulphur. The early or pre-pink application of Bordeaux mixture gave excellent results in Gallia County. In many cases north of the central region the delayed dormant spray, successful in 1919, made a failure in scab control for 1920. (Selby, Sept. 1)

Indiana: Extremely severe in Indiana this season. (Gardner, July 1)

Illinois: Scab was very serious throughout the central and western apple growing regions of the state. The foliage suffered severely owing to application of sprays following early infection. A long period of cold, damp weather during the cluster bud stage favored fruit infection. Failure to apply the cluster bud spray resulted in almost total loss of crop in many cases. 5-10% loss this year is conservative. (Anderson, Sept. 1)

Minnesota: Generally distributed throughout the state. Severe local epidemics are common. Some orchards are very heavily infected. First report June 20. (Leach, Sept. 1)

Arkansas: Severe on unsprayed fruit. Well controlled in well kept orchards. (Elliott, Sept. 1)

Oregon: Serious in western Oregon, especially in the Willamette Valley, where many young orchards are just coming into bearing and the growers have not yet learned the habit of timely and thorough spraying. In many commercial orchards 50% of the crop will be culls. (Barss, Sept. 1)

Washington: On July 27, Mr. Frank reported a "small amount of scab" on the West Side. "Not serious yet." In eastern Washington we have more scab than during the last four years. Late infections were showing on leaves and on fruit August 1 and September 1 respectively. (Heald and Dara, Aug. 1)

Fire blight caused by *Bacillus amylovorus*

Taking the country as a whole it may be said that fire blight of apples is decidedly more prevalent this year. Reports from the following states are at hand. (See also reports in Plant Disease Bulletin 4: 13-14, 1920)

Vermont: Very common. Most trees that have set any quantity of fruit show much fire-blight around Burlington. Rainy weather during early May and during the blossoming season of the early apples may have been responsible. (Lutman, July 15)

Massachusetts: Very abundant in most sections of the state. (Krout, Sept. 1)

New Jersey: Widely distributed but not severe. (Cook, Sept. 1)

Pennsylvania: First report May 17 on Stayman and York in Adams County. Early infection did not look bad. For the past two weeks, however, blight is taking hold and the customary twig blight and blossom blight seems to be working farther down the branches than usual. (Thurston, July 1)

Virginia: Very slight for the commercial orchard section as a whole. (Fromme, Sept. 1)

West Virginia: Not prevalent and has caused very little loss this season. (Giddings, July 1)

Ohio: Has developed locally in variable virulence but in all cases was reported after blooming, starting upon new growth. The prevalence is more marked and general than in 1919. (Selby, Sept. 1)

Indiana: Worse than usual this year. Usually destructive only where blighted pear trees are nearby. (Gardner, July 1)

Illinois: Very little early in season. Appeared on fruit when about the size of marbles. Not serious in any part of the state. (Anderson, Sept. 1)

Wisconsin: After sending in my July 1 report on apple fire blight, the disease commenced to show up in Madison and reports of it have come from every section of the state. It seems that there is more twig blight than for a number of years. (Vaughan, July 28)

Minnesota: General throughout the state and very severe, probably the worst epidemic in several years. (Leach, Sept. 1)

Nebraska: Present in usual amounts. (Goss, Sept. 1)

Mississippi: Twig blight is serious in many of the northern counties of the state. This is probably one of the more serious apple troubles. (Neal, Sept. 1)

Arkansas: Some damage to Jonathans early in the year. (Elliott, Sept. 1)

Texas: Epidemic, 10% loss. (Taubenhaus, July 15)

New Mexico: Very slight. (Leonian, July 1)

Nevada: Has been quite prevalent this season over the state. (Lantz, Sept. 1)

Idaho: A number of orchards of Spitzenburg apples have been dug up on account of blight infection. Not as much blight as last year in most sections. (Hungerford, July 1)

Oregon: Serious in Rogue River Valley; some in the Umpqua Valley but total damage slight; Willamette Valley negligible; no reports from sections east of the Cascades but disease doubtless present. (Barss, Sept. 1)

Washington: Reports from Clarkston, White Salmon, Yakima Valley and Upper Columbia, but not severe in any of these localities. (Heald and Dana, Aug. 1)

Blotch caused by Phyllosticta solitaria

In the regions where blotch occurs heavy infections have taken place this year on trees of susceptible sorts that were not properly sprayed.

Pennsylvania: Reported on twigs in Wyoming County, March 17. One hundred per cent on Smith Cider, Lackawanna County, July 17. Other reports from Schuylkill, Carbon and Blair Counties indicate especial severity on the above variety. (Thurston, July 1).

Virginia: Very severe locally but not of importance for the commercial crop of the state as a whole. One hundred per cent infection seen on unsprayed Ben Davis trees at Crozet. (Fromme, Sept. 1)

Kentucky: Very severe in unsprayed orchards; prevalent in all parts of the state. (Valleau, Sept. 1)

Ohio: It is believed that more than the average per cent of blotch has developed on orchards that have not received spray treatment for that disease. (A. D. Selby, Sept. 1)

Illinois: Very bad on early susceptible varieties such as Duchess and Benoni.

Where orchards were well sprayed early in the season the fruit was in fair condition. Failure to apply blotch spray early resulted in very poor control; 5-10% loss on susceptible varieties. (Anderson, Sept. 1)

Alabama: Blotch was very serious in Alabama this year, the loss in some orchards being as high as 25%. Where spraying was carried on the disease was checked but not controlled entirely. (Thiel, Sept. 1)

Mississippi: Observed in Oktibbeha, Pontotoc, and Union Counties. Not serious in well sprayed orchards. (Neal, Sept. 1)

Texas: Epidemic -3% loss. (Tauberhaus, July 15)

Arkansas: Very severe on fruit not properly sprayed. (Elliott, Sept. 1)

Cedar rust caused by Gymnosporangium juniperi-virginianae

In the Shenandoah Valley of Virginia and in northeastern West Virginia cedar rust is abundant and the cause of heavy losses to York Imperials and other susceptible varieties when in the vicinity of red cedar trees. Many illustrations are at hand showing that the disease can be eliminated by red cedar eradication. Reports from Virginia, Tennessee and Illinois have already been given (Pl. Dis. Bul. 4 : 15, 1920). In the following states the disease is not of great commercial importance.

Indiana: Prevalent on susceptible varieties. (Gardner, July 1, 1920)

Minnesota: Not very prevalent. A few isolated infections have been reported. First report July 2. (Leach, Sept. 1)

Alabama: Present in the state. No data on damage.

Arkansas: Extremely severe in regions where cedars are plentiful. Trees (Jonathans) defoliated in July and August. Cedar trees nearly all cut in the better commercial orchard districts. (Elliott, Sept. 1)

Bitter rot caused by Glomerella cingulata

New Jersey: Bitter rot common. (Cook, Sept. 1)

Virginia: Not as severe as last year and possibly less than normal. Slight infection appeared at the usual time in mid July but development and spread has not been rapid. (Fromme, Sept. 1)

Illinois: No reports of bitter rot to date. Weather has been unfavorable, since August was cool and dry in most sections of the state. Rainy periods were followed by cold weather. (Anderson, Sept. 1)

Black rot caused by Physalospora cydoniae

Massachusetts: Very abundant on leaves and limbs in most unsprayed orchards, some trees being almost defoliated by it. (Krout, Sept. 1)

Indiana: Very prevalent on the foliage. (Gardner, July 1)

Alabama: Present in the state. No data on damage. (Thiel, Sept. 1)

Black rot caused by Sphaeropsis malorum

Pennsylvania: First report of frog-eye leaf spot from State College July 10 - slight. Reported 4% in Bradford County with average of eleven orchards. (Thurston, July 1)

Anthraco nose caused by Neofabraea malicorticis

Washington: About the same as in former years from White Salmon sections and from west of the Cascades. (Heald and Dana, Aug. 1)

Rosette (non-parasitic)

Idaho: About the usual amount of damage from rosette. Very clear evidence of the influence of cultural and soil condition upon the disease noted in a number of orchards. In one orchard of young trees, all of the same variety, part of the orchard had been continuously cropped to alfalfa for ten years and no rosette was present. The rest of the orchard had been clean cultivated and cropped to wheat and garden truck. Every tree was rosetted in this area. (Hungerford, July 1)

Sun scorch (non-parasitic)

Virginia: Specimens have been received from a number of growers of leaves that show a scorched condition, evidently due to hot sun following a period of excessive rainfall. Complaints began to come in about the middle of August. The rainfall has been unusually heavy during the entire month. (Fromme, Sept. 1)

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POTATO WART DISCOVERED IN ALLEGANY COUNTY, MARYLAND.Third state now added to list of those where disease occurs.

Field assistants of the Plant Disease Survey working under the leadership of C. L. Farabaugh have found potato wart in three mining villages in the bituminous coal fields of Western Maryland. On September 9 a single, infected, volunteer potato plant in a garden at Lord, Maryland was found. The specimen showed typical symptoms of wart and a microscopic examination revealed the presence of the organism. The owner of the garden, and also a neighbor, said that their potatoes were badly warted last year. On September 18 the disease was discovered again in one corner of a single garden at Mount Savage, which is about 8 miles northeast of the other location; and three days later several hills showing wart were located in a garden at Eckhart Mines, a village about midway between Lord and Mount Savage. In all of these cases the owners mentioned that the disease had been bad in previous years.

These three new findings draw the quarantine machinery of another state into operation and widen the problem of effective control. The finding of the disease on a single, volunteer plant in a locality emphasises the difficulty of locating all gardens that harbor the potato wart organism.

POTATOLate blight caused by *Phytophthora infestans*.

The weather of the latter half of September has been comparatively dry in the northeastern late potato area where *Phytophthora* is prevalent. On this account the disease has not progressed greatly and not much more rot has developed. Maine has had more rain than most of the other states so it is probable that the disease has made some progress there, but killing frosts may be expected about October 1 to put an end to growth of that part of the plant and fungus above ground.

Between the dates of August 5 and September 7, twelve cars of New Jersey potatoes showed an average of 2% late blight dry rot, when inspected at destination, and many other cars showed excessive amounts of slimy soft rot and *Fusarium* rot which were primarily due to late blight.

Correction: On page 55 of the September 1 issue of this Bulletin the date of the first appearance of late blight in Wisconsin should read July 25 instead of June 25.

New York: Week of frequent showers, deficient sunshine, and moderate temperature. Conditions favored spread of late blight of potatoes; dry weather and sunshine needed to prevent increased blight and rot. (Nat. Weather and Crop Bul. s. 1920: 3, Sept. 15, 1920)

New Jersey: On September 3, I made a second trip to the Monmouth County potato territory..... From the pathological point of view, conditions have changed since my last visit, made on August 18. At that time, late blight injury followed by slimy soft rot, was common in the fields. This situation was made possible at that time by the heavy rainfall which had prevailed for several weeks. Now, after a period of dry weather, there is but little rot found in the fields. I saw no late blight injury of tubers in barrels examined in the field or in stock that was passing over the grader at the car. This does not necessarily mean, however, that the Inspector will find no late blight dry rot in these cars. Since the disease was present in the field earlier in the season, it is probable that many of the tubers are infected and will develop the disease if held in storage. (F. C. Meier, Bureau of Markets Div. Letter 1, No. 24: 8, Sept. 9, 1920)

Delaware: Some rot reported. (Weekly Crop Notes, * Sept. 9, 1920)

Virginia: Late potatoes doing well, except in Orange and Roanoke Counties, where rot is reported. (Nat. Weather and Crop Bul. s. 1920: 3, Sept. 15, 1920)

North Carolina: Fall or mountain crop of potatoes injured by excessive rainfall causing rotting. (Weekly Crop Notes, * Sept. 16, 1920)

Michigan: Crop hit by late blight in some sections. (Weekly Crop Notes, Sept. 9, 1920)

Wisconsin: Four centers of infection have been seen; two in Oneida County, one in Price County, and one in Forest County. Dry weather in the central and western potato sections has been important in preventing an epidemic. Tuber rot on Irish Cobbler was noted in Price County, (Vaughan, Sept. 1)

Mosaic (cause undetermined)

Maine: Quite common in the vicinity of Corinna. Counts of mosaic run from 2 to 80%. (C. R. Stevenson, Sept. 11)

New Hampshire: Very prevalent throughout the state. (Butler, Sept. 1)

Vermont: Twenty-five to fifty percent of the potatoes of the state are affected; in some localities it is below this average; in others above. (Lutman, Sept. 1)

Wisconsin: The mosaic which showed up earlier in the season has been largely masked by dry weather and development of the vines. Late planted Triumphs have much more mosaic than early planted, showing the importance of environment in the severity of this trouble. (Vaughan, Sept. 1)

Idaho: Mosaic rather serious in some fields in north Idaho. Not common in the southern part of the state. (Hungerford, Sept. 1)

In New York this season inspection of potatoes for seed purposes is being made. The results of some of this work are already available and Dr. Chupp has

furnished figures showing the amounts of vine diseases that were present in the inspected fields. The data on mosaic and leaf roll are presented in the accompanying table. The fields inspected of course represent the best potatoes of each county so that the averages for each disease are far too low for the entire state.

Table 9. Preliminary report of mosaic and leaf roll, August 1920, based on results obtained from inspections made by H. H. Clum, in New York.

County	: Acreage	: Number of fields inspected	Mosaic		Leaf roll	
			: Number of fields affected	: Average percentage of mosaic	: Number of fields affected	: Average percentage of leaf roll
Allegany	: 115.75	: 35	: 26	: 0.9	: 11	: .05
Cayuga	: 27.5	: 13	: 9	: 1.33	: 13	: 5.9
Chemung	: 7.	: 2	: 2	: 1.64	: 2	: 2.37
Erie	: 50.25	: 17	: 6	: 0.16	: 17	: 3.8
Genesee	: 54.2	: 11	: 2	: 0.23	: 8	: .23
Livingston	: 25.	: 9	: 6	: 1.37	: 5	: 2.01
Monroe	: 56.25	: 16	: 11	: 0.54	: 15	: 10.66
Onondaga	: 75.25	: 25	: 25	: 10.5	: 24	: 7.27
Ontario	: 59.	: 20	: 17	: 2.42	: 14	: 2.
Orleans	: 80.75	: 23	: 16	: 0.45	: 22	: 6.81
Oswego	: 61.25	: 24	: 23	: 14.11	: 18	: 3.54
Seneca	: 25.5	: 13	: 9	: 0.08	: 4	: .47
Steuben	: 72.5	: 16	: 12	: 0.52	: 6	: .4
Wyoming	: 63.	: 18	: 11	: 0.77	: 14	: 1.25
	: 781.02	: 242	: 175	: 2.08	: 173	: 3.39

Leaf roll (cause undetermined)

Maine: Quite common in the vicinity of Corinna. Counts of leaf roll run from 1 to 40%. (C. R. Stevenson, Sept. 11)

Vermont: Very general but, of course, not present in all localities or fields. Mr. Gilbert estimates that 5-10% of the seed potatoes he has seen are so affected, and these seed fields are probably a little above the average. (Lutman, Sept. 1)

New Hampshire: Very little observed. (Butler, Sept. 1)

Wisconsin: Very little of this trouble has been observed. The rolling of leaves seems to be associated in many cases with root injury by black leg or Rhizoctonia. (Vaughan, Sept. 1)

New York: (See Table 9. above).

Tip burn.

Vermont: Much less important than usual. I would estimate that in the Champlain Valley in average years potatoes had lost 40-50% of their foliage from tip burn by September 1. This year not more than 15-20%. No tip

burn locally of any importance before about August 20, but made rapid progress for a few days then. (Butman, Sept. 1)

Indiana: Not as severe as in 1919. (Gardner, Sept. 1)

TOMATO

Fusarium wilt caused by Fusarium lycopersici.

What is thought to be Fusarium wilt is reported from Michigan for the first time. The report cannot be considered authentic, however, until specimens have been carefully examined by men familiar with the disease.

New Jersey: In one new locality. (Cook, Sept. 15)

Virginia: Reported from Starkey, Roanoke County, causing almost total loss of susceptible varieties. Norton and Marvel were fully resistant. (Fromme, Sept. 15)

Ohio: In all fields where the Fusarium wilt has been demonstrated in past years its presence has been noted this season and the loss occasioned by it, especially in the truck sections, has been very severe. Wilt resistant varieties, however, have given very promising returns for Ohio. Losses due to Fusarium wilt are reckoned as high as 50% in some sections. (Thomas, Sept. 15)

Indiana: Common in canning crop of central Indiana, usually affecting scattered plants in a field. As yet our soils are not badly infested with this disease. Evidence was afforded of its extensive introduction into the state with southern-grown plants this year. (Gardner, Aug. 15)

Present to a limited extent in many fields but not yet a limiting factor in the Indiana crop. (Sept. 15)

Michigan: Two suspected cases reported, Adrian, Lenawee County, and Lansing. These are first cases recorded for the state, and probabilities are that the cases were true wilt. (Coons, Sept. 15)

Wisconsin: Specimens have been examined from Walworth and Grant Counties. In gardens only. Loss only a few plants. (Vaughan, Sept. 15)

Leaf blight caused by Septoria lycopersici.

Septoria is causing much damage in some states this year, as shown by the following reports. As usual it is the most destructive of the tomato diseases.

New York: More or less common wherever tomatoes are grown. First reported May 24 in Albany County. Since then it has been observed in Niagara, Erie, Kings, Tompkins, and Chautauqua Counties. (Chupp, Aug. 15)

Niagara County: Septoria not as serious as in 1919, but is very prevalent and doing considerable damage. Of the total reduction in yield due to leaf diseases, approximately 25% is due to Septoria. (R. P. White, Sept. 15)

New Jersey: Very abundant and the cause of heavy losses. (Cook, Sept. 15)

Virginia: Severe, especially so in western canning sections. Defoliation

almost complete by September 1. Production curtailed by as much as 50% in many fields. (Fromme, Sept. 15)

Ohio: There is no difficulty in demonstrating the presence of leaf blight in nearly all tomato fields, yet we are assured that loss occasioned by this organism alone seems lower than the past season. (Thomas, Sept. 15)

Indiana: Especially severe this year both in gardens and in canning crop. (Gardner, Aug. 15)

Most prevalent and destructive disease of this crop this year owing to the wet weather. The disease is severe in gardens and in the canning crop. Extreme defoliation with subsequent sunscald and premature ripening of small fruit has been caused. (Sept. 15)

Michigan: Extremely common, making quality of fruit very poor this year. Loss ranging from 10 to 25%. (Cooms, Sept. 15)

Wisconsin: A small amount of leaf blight has been seen and reported. Damage slight. (Vaughan, Sept. 15)

Minnesota: General in its occurrence. Slight to moderate infection. Severe in some localities. Earliest report July 20. (Section of Plant Pathology, Sept. 15)

Late blight caused by Phytophthora infestans.

It is hoped that collaborators will take special pains to note and report all occurrences of late blight on tomatoes, as it is thought that considerable can be learned about the weather relations of Phytophthora infestans through a study of distributional data. Cases in New York and Ohio as reported below are especially interesting as those states are on the outer boundaries of occurrence.

New York: Albany and Cayuga Counties, July 12. (Chupp, Aug. 15)

Virginia: Severe throughout south-western Virginia. Many crops at Blacksburg almost total loss. (Fromme, Sept. 15)

West Virginia: Prevalent in gardens at Gary (Aug. 27), and at Fayetteville (Aug. 28). (Hesler)

Ohio: Throughout the latter part of August and early September we have had no difficulty in finding the late blight infections in nearly all tomato plantings investigated. The result of the attacks has been varied, ranging from only a marked infection to a 100% loss, depending largely upon the location of the plantings, regarding drainage, aeration, and whether or not the tomato vines were staked and tied. In many cases both the fruit and vines had been equally and seriously attacked. (Thomas, Sept. 15)

Early blight caused by Macrosporium solani.

New York: More or less common wherever tomatoes are grown, but usually reported less prevalent than the Septoria leaf blight. First reported May 24 in Albany County. Since then it has been observed in Niagara, Erie, Thompsons, Chautauqua, and Greene Counties. (Chupp, Aug. 15)

Niagara County: Early blight of tomatoes also very prevalent in this section, but not as serious as Septoria lycopersici. Several fields badly infested and practically all the reduction in foliage due to it, very little Septoria being present. However, both are usually present in the same field. Approximately 10% of the total reduction in yield is due to Macrosporium. (R. P. White, Sept. 15)

New Jersey: Very abundant. (Cook, Sept. 15).

Ohio: The greater part of defoliation of tomato plants throughout northern Ohio was occasioned by early blight, an observation which is far different from that obtained last year. Although some growers do not consider such attacks worthy of much notice, it is very evident that the fruit which set from the middle to the latter part of August failed to develop, thereby occasioning quite serious loss. (Thomas, Sept. 15)

Indiana: Not at all common in canning crop of central Indiana. Occurs in gardens and to a considerable extent in the canning crop in southern Indiana. (Gardner, Aug. 15)

Michigan: Common, producing slight loss as a leaf spot, and perhaps 1% loss as a fruit rot. (Coons, Sept. 15)

Wisconsin: A small amount of early blight has been seen; none reported. (Vaughan, Sept. 15)

Minnesota: Not very common this season. (Section of Plant Pathology, Sept. 15)

Blossom end rot (non-parasitic)

New York: Very prevalent, July 12. (Chupp, Aug. 15)

Niagara County: Not serious in this locality this year. Not nearly as bad as last. Only a few fields were planted late or did not get a good start were caught by the dry spell of August, and show any amount of blossom-end rot. Total reduction due to blossom-end rot will be around 1%. (R. P. White, Sept. 15)

Indiana: Prevalent on early set of fruit in canning crop. (Gardner, Aug. 15)
Very prevalent and destructive in the canning crop. Worse than in 1919. There is very much so-called "rot" in the canning crop this year due mostly to blossom-end rot, infected growth cracks, infected hail injury, and infected worm injury. In addition, catface is very common. (Gardner, Sept. 15)

Wisconsin: Considerable loss from blossom-end rot has occurred in the eastern and southern sections in city truck gardens. (Vaughan, Sept. 15)

Idaho: Common in non-irrigated sections. Also doing considerable damage in irrigated sections where the water supply has not been sufficient. (Hungerford, Sept. 15)

Washington: Reported from Spokane and Kennewick districts. (Heald & Dana, Aug. 15)

Mosaic (cause undetermined)

Mosaic has been reported from New York, where it is apparently unimportant, and from Indiana as follows:

"Prevalent throughout central Indiana. Apparently not as severe as last year. The yield is reduced on plants 'infected' early in the season, but it is doubtful if the plants infected late in the season will show any reduction in yield." (Gardner, Aug. 15)

Leaf roll (cause undetermined)

Virginia: Arlington Experiment Farm: Fifteen or twenty cases of tomato leaf

roll, very similar in appearance to potato leaf roll, were found on the Arlington Experiment Farm at Rosslyn, Virginia, this year. These plants have a shortened, stunted appearance, a very stiff, erect growth, and thick up-rolled leaves. Usually they are barren. They resemble plants affected by Western or Yellow Blight in general appearance and in the purple color along the veins, but lack the yellow color of the foliage and the cortical sloughing of the rootlets. (Pritchard, Sept. 9)

Other diseases.

Western yellow blight, caused by Fusarium sp., has been reported from New Mexico and Idaho as less serious than last year, although prevalent.

Western blight, said to be caused by Rhizoctonia sp., is reported from Washington as present in the same amounts as in previous seasons.

Winter blight, cause undetermined, is reported from Albany County, New York, and from New Jersey as follows:

"The so-called 'winter blight' previously found in greenhouses is a very severe out-door disease in some localities." (Cook, Sept. 15)

BEAN

Anthracnose caused by Colletotrichum lindemuthianum

It seems that anthracnose while not frequent in Michigan and almost absent in states farther west, is serious in New York this season.

Vermont: Unimportant this year. No complaints of it from other parts of the state, so would judge that it had been a comparatively free year.

Possibly due to the very dry weather in June and August. (Lutman, Sept. 1)

New York: This disease is worse this year than it has been since 1915. Possibly a 10-12% loss in the crop. (Burkholder, Sept. 1)

Virginia: Severe in Montgomery, Rockbridge and Clarke Counties. Excessive summer rains resulted in severe pod infection on late crop. (Fromme, Sept. 1)

Wisconsin: A very small amount of the disease has been seen or reported.

(Vaughan, Sept. 1)

Blight caused by Bacterium phaseoli

Vermont: Quite a lot of blight locally during July but dried up and was unimportant during August. Considerable injury in reduction of leaf surface. (Lutman, Sept. 1)

New York: Not severe this year. One to two percent loss in crop. (Burkholder, Sept. 1)

Virginia: Severe at Blacksburg, also reported from Lynchburg. (Fromme, Sept. 1)

Wisconsin: Considerable blight has been seen. However, the loss is not considered severe. (Vaughan, Sept. 1)

Mosaic (cause undetermined)

Vermont: Observed locally on dwarf pole horticultural. Seemed to be quite serious in that it caused the early death of the plants in August (hot and fairly dry). (Lutman, Sept. 1)

New York: Susceptible varieties not being grown so extensively this year. Loss due to the disease small. (Burkholder, Sept. 1)

Wisconsin: Very little mosaic has been observed. (Vaughan, Sept. 1)

Rust caused by Uromyces appendiculatus

New York: Only a trace observed. (Burkholder, Sept. 1)

Virginia: Not unusually severe but causing heavy loss on susceptible varieties, especially in southwestern part of the state. (Fromme, Sept. 1)

Wisconsin: A very small amount of rust has been observed. It occurs so late in the season that little damage is done. (Vaughan, Sept. 1)

Stem rots caused by various fungi

Stem rot, caused by Fusarium martii phaseoli, has been fairly general in New York, however, the loss in yield from the disease was small due to sufficient rains according to W. H. Burkholder.

Stem rot, caused by Fusarium sp., was rather common in Indiana earlier in the season.

Stem rot, caused by Sclerotium rolfsii, was reported from West Virginia and Georgia.

ONION

Smut caused by Urocystis cepulae

New York: Present in usual amounts, up to 50%, and spreading gradually to new muck lands. Treatment quite general and effective. Average estimated reduction in yield 18-20% in Wayne County. (H. W. Dye, Sept. 15)

Ohio: Where seed treatment has not been employed serious loss has been occasioned. No section seems to be free from the disease yet its presence is more manifest in some than in others. (Thomas, Sept. 15)

Indiana: Very severe in a few fields in Lake County near the Illinois line. These are devoted to the growing of sets. The formalin drip treatment was applied to a part of these fields under the direction of Dr. C. T. Gregory this spring with successful results. (Gardner, Sept. 15)

Wisconsin: Smut is found in a few new fields this year in the Racine-Kenosha district. The control with formaldehyde solution applied with the seed has been satisfactory in most cases. (Vaughan, Sept. 15)

Downy mildew caused by Peronospora schleideni

New York: Wayne County: General in occurrence but coming just as the onions were beginning to go down normally so causing no marked reduction in yield.

In some late planted fields there was considerable reduction. Decidedly more prevalent than in preceding years but appearing late. (H. W. Dye, Sept. 15)

Louisiana: Present, but no survey made this season. (Edgerton, July 1)

Ohio: Very serious losses have been reported in fields located upon low, muck soil especially where heavy growth developed and thick plantings were made. Weather conditions are held largely responsible for losses which have been much more serious than during normal years. (Thomas, Sept. 15)

Other diseases

Pink root, caused by Fusarium sp., is present in 25% of the fields of Wayne County, New York, and probably reducing the yield in a few, according to H. W. Dye. The dry season has apparently favored the destructiveness of the disease. A similar disease was found in Lake County, Indiana, but was not doing any damage, according to M. W. Gardner.

Pink root, caused by Fusarium malli, is prevalent in Texas, probably causing 10% loss.

Black mold, caused by Macrosporium sp., was very severe on seed onions in the Bayou La Fourche district in Louisiana according to Edgerton.

Smudge or anthracnose, caused by Colletotrichum circinans, is prevalent on white onions in the Indianapolis, Indiana market gardens.

Neck rot, caused by Botrytis alii, is reported in the 1919 crop at Pullman, Washington.

WATERMELON

Stem end rot caused by Diplodia sp.

Diplodia is reported by McClintock as being present to some extent in all fields in Georgia and affecting 5% of the melons in some. In Indiana Gardner reports it rather common on malformed and stunted fruits in the field, usually following the non-parasitic blossom end injury. It does not occur as a stem end rot in Indiana according to him.

In shipments of watermelons from the South it is the most common decay and very destructive in some cases.

Table 10. Percentages of stem end rot in carload shipments of watermelons from the South, as determined by food-products inspectors of the Bureau of Markets, (Aug. 6-23, 1920).

Origin of shipment	No. of cars	Percentage of stem end rot	Origin of shipment	No. of cars	Percentage of stem end rot
Georgia	46	16	Texas	5	10
Maryland	1	35	Unknown	3	5
Missouri	16	4	Total number of cars with stem end rot		78
North Carolina	1	2	Average amount of stem end rot in 78 cars		12%
South Carolina	6	11			

Anthracnose caused by Colletotrichum lagenarium

Anthracnose seems to be not very important in reducing the yield in states from which it has been reported but it has greatly disfigured the fruit in many cases and is a very common disease of watermelons on the market. Not only does it detract from the market value of the melon but sometimes the lesions penetrate the rind and are secondarily infected with other decay-producing organisms, rendering the melons worthless.

Table 11. Percentage of watermelons affected with anthracnose in individual cars from various states as determined by food-products inspectors of the Bureau of Markets (Aug. 6 to Aug. 27, 1920).

Origin of shipment	Market	Percentage of spotted fruit	Origin of shipment	Market	Percentage of spotted fruit
Georgia	Buffalo	67	North	Pittsburgh	9
	Chicago	100	Carolina	"	Slight
	Cleveland	2	South	Buffalo	75
	Indianapolis	9	Carolina	"	5
	New Orleans	15		Pittsburgh	40
	"	25		"	68
	"	75		"	50
	"	8		St. Louis	62
	"	50			
	New York	50			
	"	45	Texas	Kansas City	16
	Pittsburgh	10		"	10
	"	5			
	"	13	Unknown	Chicago	45
	"	11		St. Louis	80
	"	15			
	"	3			
	"	25			
	"	7			
	"	13			
	"	9			
	"	7			
	"	2			
Maryland	"	20			
Missouri	Kansas City	10	Total number of cars with anthracnose..38		
	Pittsburgh	25	Average amount of anthracnose in		
			38 cars29%		

CANTALOUPE

Leaf blight caused by Alternaria brassicae nigrescens

Indiana: Prevalent throughout the Vincennes region. Causes a distinct loss in yield due to reduction of foliage surface. Next to bacterial

wilt, this is the most important cantaloupe disease in this state. (Gardner, Aug. 15)

Bacterial wilt caused by Bacillus tracheiphilus.

Virginia: Unusual number of complaints this year of wilt on both cantaloupes and cucumbers. Production cut 50% or more in many fields. (Fromme, Sept. 15)

Indiana: Most important cantaloupe disease. Causes marked reduction of stand early in season. Entails expense of resetting. Especially objectionable because Indiana growers transplant from seed bed to field and plant in hills, so every missing plant means loss. (Gardner, Aug. 15)

Mosaic (cause undetermined)

Georgia: About 2% in fields observed to date. (McClintock, Aug. 15)

Indiana: Common in the Vincennes region. Becoming an important loss-producing factor. In general, the disease becomes epidemic too late to seriously affect the yield. (Gardner, Aug. 15)

Rots caused by various organisms

About 425 cars of California cantaloupes have been examined by market inspectors during July, August and the early part of September (until Sept. 7). Of these 425 cars approximately 225 showed melons in varying stages and amounts of decay, while the remaining 200 cars were practically free from rots of all kinds. The average percentage of decay in the 225 cars was about 11% and in the 425 cars about 6%. In some cars as many as half the melons were affected and in one car as high as 75% Rhizopus rot was noted.

The decay was largely reported as Rhizopus rot, Fusarium rot, and green mold rot but bacterial, blue mold, gray mold and watery soft rots were also prevalent.

During the early part of the shipping season the majority of the shipments were free from decay but during August and September cars without rot were much less frequent.

CUCUMBER

Reports on cucumber diseases have been received from S. P. Doolittle of the Office of Cotton, Truck and Forage Crop Investigations, who is making a special study of cucumber troubles, and from M. W. Gardner, who has done considerable work with diseases of this crop in the past.

Bacterial blight caused by Bacillus tracheiphilus

Bacterial blight seems to be rather more prevalent than usual on Long Island and in Virginia and Indiana.

New York, Long Island: Wilt caused serious loss in cucumber sections throughout the island, injury varying from 10 to 75% of plants, probably 10% on the average. (S. P. Doolittle, Sept. 15)

New Jersey: Some blight is reported on melons and cucumbers. (Weekly Crop Notes, Aug. 19)

Virginia: Unusual number of complaints this year of wilt on both cantaloupes and cucumbers. Production cut 50% or more in many fields. (Fromme, Sept. 15)

Indiana: Next to mosaic in importance. This year wilt remained destructive throughout the season, whereas it ordinarily is not evident during the latter part of the season. Its prevalence may be correlated with the great abundance of striped beetles this year. (Gardner, Sept. 1)

Conditions similar to Illinois and Wisconsin. (S. P. Doolittle, Sept. 15)

Illinois: Fields in northern Illinois showed 1 to 3% wilt early in season. (S. P. Doolittle, Sept. 15)

Wisconsin: Wilt was widespread, but caused little damage, about 1 to 2% of plants in most fields. (S. P. Doolittle, Sept. 15)

Mosaic (cause undetermined)

Mosaic is probably injuring the cucumber crop more than any other single disease. It is wide-spread over most important commercial cucumber sections and is the cause of serious losses.

New York, Long Island: All fields visited about Farmingdale, Greenlawn, and Deer Park showed the disease, nearly 100% of plants mosaic on August 28. Mosaic found less severe on eastern end of island but was present at Riverhead and Calvin in a number of fields. (S. P. Doolittle, Sept. 15)

Virginia: Mosaic severe (100%) on cucumbers at Arlington Farm, Virginia, late in August. (W. W. Gilbert, Sept. 15)

Indiana: Widely prevalent in gardens and pickle crop. The most serious cucumber disease in the state. In a recent survey of cucumber patches in Marshall County, mosaic was found very abundant, but, as a rule, not of as long standing as in previous years. The disease seemed to be of recent origin. Mosaic fruits were noted in the several pickling stations visited. (Gardner, Sept. 1)

Mosaic reported as severe about Plymouth, Indiana. General reports indicate disease is widespread and conditions about same as in Illinois and southern Wisconsin. (S. P. Doolittle, Sept. 15)

Illinois: Twenty-five to fifty per cent of plants affected in majority of fields in northern part of state, about Marengo and Harvard. Serious in Chicago district. (S. P. Doolittle, Sept. 15)

Michigan: Conditions in southern Michigan similar to those in Wisconsin. Probably 25-30% of fields show mosaic. (S. P. Doolittle, Sept. 15)

Wisconsin: General and destructive in many fields. (R. E. Vaughan, Sept. 1)

Disease severe in southern part of state, 60-70% of fields affected about Sparta and Rockland. Reports indicate about 50% of fields affected throughout southern Wisconsin. Little of the disease north of Fond du lac. (S. P. Doolittle, Sept. 15)

Anthracnose caused by *Colletotrichum lagenarium*

- New York: Found few plants in one field on Long Island, at Mattituck. (S. P. Doolittle, Sept. 15)
- Wisconsin: Trace of anthracnose found in two localities (Sparta and Madison). (S. P. Doolittle, Sept. 15)
- Arizona: Causing severe damage in a small garden at Wickenburg, Maricopa County. (Brown, July 25)

Angular leaf spot caused by *Bacterium lachrymans*

Angular leaf spot apparently caused only slight damage this year as compared with some other seasons.

- New York, Long Island: Disease causing little damage, present in about 10% of fields visited. (S. P. Doolittle, Sept. 15)
- Indiana: Only a very limited amount was found in a number of Heinz fields visited and the contrast between such fields and others planted with untreated seed is very striking. Seed disinfection controls the disease effectively. The marked scarcity of this disease as compared with its prevalence in Heinz fields in 1915, 1916, and 1917 is very striking. (Gardner, Sept. 1)
- Illinois: Very little angular leaf spot found. (S. P. Doolittle, Sept. 15)
- Wisconsin: Very little angular leaf spot has been seen or reported. (Vaughan, Sept. 1)
- Angular leaf spot caused very little injury this season owing to dry weather. (S. P. Doolittle, Sept. 15)

TOBACCO

Wild fire caused by *Bacterium tabacum*

- Tennessee: Definite reports in July and September from counties in northeastern Tennessee. In one case Judy's Pride affected, while White Burley nearby not affected. In Union County a 50% loss is reported by one grower. The disease is apparently becoming important. (Hesler, Sept. 1)
- Much is being cut partially ripe on account of "wild fire" damage. (Weekly Crop Notes, Sept. 16)
- Wisconsin: Occurred at the Wisconsin Experiment Station. Not seen elsewhere in the state. Many other leaf spots which might be confused with wildfire occurred. (James Johnson, Sept. 1)

Other Diseases

Root rot, caused by *Thielavia basicola*, is reported by James Johnson, Sept. 1 as very serious in Wisconsin this year owing to low temperature. Actual damage was somewhat obscured this year by drought following. Loss to Wisconsin tobacco growers over \$1,000,000.

Mosaic, Cause undetermined, occurred in relatively great abundance this year, particularly in Maryland and Wisconsin. Very little in Pennsylvania and Connecticut Valley. In Wisconsin considerable damage was done which is not ordinarily the case. (James Johnson, Sept. 1)

Frenching, cause undetermined, according to James Johnson Sept. 1, occurred in Wisconsin in isolated plants and places, not serious.

Non-parasitic leaf spots, cause unknown, are fairly abundant this year in Wisconsin. (James Johnson, Sept. 1)

Members of the Office of Tobacco and Plant Nutrition Investigations have made a considerable number of observations of tobacco diseases in various states this season. A summary of some of this work has been furnished by Dr. James Johnson, Agent for that office and located at Madison, Wisconsin.

Table 12, 1920. Status of tobacco diseases as outlined by Dr. James Johnson:

Disease	Condition by states							
Black root rot (Thielavia)	Corn:	Mass.	Pa.	Md.	Ohio	Kv.	Wisc.	
	heavy	heavy	cons.	little	heavy	heavy	heavy	
Brown root rot (Rhizoctonia ?)	slight	cons.	?	cons.	?	?	?	
Damping off (Pythium or Rhizoc.)	Practically always some loss from these organisms.							
Hollow stalk (Bacterial)	Never serious - occasional plants occur.							
Wilt (Fusarium)	none	none	none	?	cons.	some		
					but not:			
					serious:			
Wild fire (B. Tabacum)	cons.	?	?	cons.	cons.	cons.	little	
Cercospora leaf spot	?	?	?	?	?	some	?	
Non-parasitic leaf spot	Usually occurs but not serious							
Mosaic	slight	slight	slight	heavy	cons.	cons.	more than usual	
Frenching	Usually occurs but never serious							

Note: cons. = considerable.

FRUITSGRAPES

Downy mildew caused by Plasmopara viticola

New Jersey: Common but not severe. (Cook, Sept. 15)

Ohio: Prevalent throughout state. Perhaps more abundant within the last few weeks because of somewhat higher temperature during the day with abundant moisture still continuing. (Thomas, Sept. 15)

Indiana: Has occurred to some extent this season. (Gardner, Sept. 15)

Michigan: Fairly common, no loss reported. (Coons, Sept. 15)

Black rot caused by Guignardia bidwellii

New Jersey: Destructive but no more abundant than usual. (Cook, Sept. 15)

West Virginia: Small amount near Dellslow. (Sheldon, June 25)

Virginia: The rot in later part of the season was quite severe even in vineyards that were fairly well sprayed. (C. L. Shear, Sept. 8)

Ohio: The most severe disease of the grape in Ohio this year. It has been abundant and widespread. (Thomas, Sept. 15)

Indiana: Present. (Gardner, Sept. 15)

Rpts caused by various organisms.

A rather large amount of decay is being found in California Malaga, Muscat, and Thompson Seedless grapes arriving at destination. The decay consists principally of blue mold and Rhizopus rots, but some gray mold rot and other decays are also factors. Between the dates of August 16 and September 16 an average of about 7% decay was found by market inspectors in approximately 70 carloads of grapes that showed decay in central and eastern cities.

PEAR

Blight caused by Bacillus amylovorus

New Hampshire: Scarce. (Butler, Sept. 15)

New York: Fire blight has been generally quite severe this season in sod orchards as well as in cultivated plantings. Twig blight on apples is also abundant in many orchards. (H. E. Thomas, Sept. 15)

New Jersey: Common but less severe than usual. (Cook, Sept. 15)

Georgia: Very abundant on the pears throughout the state. One Japanese sand pear and some of the hybrid pears supplied by Prof. White have shown marked resistance this season at this Station. (McClintock, Aug. 1)

Ohio: No section of the state is known to have escaped more or less loss. Pear trees located in apple orchards have suffered especially. It is to be noted that where precautions have been taken to remove blighted twigs the

early part of the season, very little loss has been experienced. Little blossom infection, however, was noted at the beginning of the season. Infection seems for the most part to be on the new growth and spread has been favored by weather conditions throughout mid-summer. (R. C. Thomas, Sept. 15)

Indiana: Extremely destructive this year. Occasioned inquiries from growers from all parts of the state. (Gardner, Sept. 15)

Michigan: Epidemic which began early checked by hot weather and loss not very much but greater than the average. (Coons, Sept. 15)

Minnesota: Pear trees in Minnesota are extremely rare. They were probably blighted, because fire blight was very severe on apples. (Section of Plant Pathology, Sept. 15)

Idaho: Blight not serious in the state this year. Only isolated cases of infection noted. Growers in general are succeeding in keeping it out of their orchards. (Hungerford, Sept. 15)

Washington: No reports. (Heald and Dana, Sept. 15)

Scab caused by Venturia pyrina

New Hampshire: Considerable damage done to fruit. (Butler, Sept. 15)

Ohio: While no great loss has been noted occasioned by this organism its presence has been observed and also reports have come to us regarding it from various parts of the state. (R. C. Thomas, Sept. 15)

Washington: Three reports. (Heald and Dana, Sept. 15)

PEUM

Brown rot caused by Sclerotinia cinerea

Brown rot has been common in shipments of plums this year, especially in those from New York and Michigan. The following table shows percentages found in 26 of the more badly affected loads when opened at destination.

Table 13 Percentages of brown rot of plums in carload shipments examined at various markets by food products inspectors of the Bureau of Markets, August 18 to September 15, 1920.

Origin :Market	Percentage:	Origin :Market	Percentage:	Origin :Market	Percentage:
of ship:where in:	of	of ship:where in:	of decay	of ship:where in:	of decay
ment :spected	brown rot	ment :spected	:	ment :spected	decay
N. Y. : Pitts-	1/2 car 8%	N. Y. : Cincin-	4	Mich. : Cincin-	14
: burgh :	2	: nati :	4	: nati :	9
: " :	3	: " :	20	: " :	17
: " :	35	: " :	7	: " :	2
: " :	45	: Indian-	4	: Chicago :	30*
: " :	18	: apolis :	10	: " :	30
: " :	40	: Va. :	75-85	: St. Louis:	8
: " :	10	: Ohio :	45-50*	: " :	45
: Phila. :	2-3	: " :	:	: Calif. :Phila.	Occas-
: " :	:	: " :	:	: " :	ional

* = associated with Rhizopus

THE PLANT DISEASE BULLETIN

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VOLUME IV

NUMBER 7

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**BUREAU OF PLANT INDUSTRY
UNITED STATES DEPARTMENT OF AGRICULTURE**

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THE PLANT DISEASE SURVEY

Vol. IV.

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Diseases of wheat, corn, rice, cotton, potato, sugar cane, peanut, apple, and peach reported in this number.

Ophiobolus, on wheat affected with a disease that has the symptoms of take-all, has been found by members of the Department of Plant Pathology at the New York State College of Agriculture. Professor Whetzel's detailed report will be found on page 103.

Reports of other root troubles of wheat also given in this issue.

Brief summary and map showing final results of 1920 potato wart given on pages 109-110.

The comparatively clear weather that has prevailed during the first half of October in the northeastern states where late blight and rot of potato is prevalent has tended to check the progress of the disease. The trouble is still causing serious damage, however.

CEREALSWHEAT

Foot rots, root rots, and seedling blights.

Since the notice of the recurrence of the so-called take-all at Granite City, Ill., (Pl. Dis. Bul. 4 : 9, 1920) reports have been received of the presence of root troubles, seedling blights, etc. in a number of different states.

The first thing of the kind to come to our attention this year was a report and specimens from C. D. Learn in Oklahoma. Mr. Learn reported as follows about June 15:

"This disease has been reported from different localities and has caused some anxiety among the wheat growers in those particular sections. The worst field I saw about Enid was 25% white heads and from that down to a trace. The farmers call it white cap and have suspected the trouble due to insects, but Prof. C. E. Sanborn, Station Entomologist, visited one of the localities and reports the trouble not that of insects. Reports of damage from 3% to 50% have been received.

"At the lower node black pycnidia develop which contain hyaline oblong spores. The basal leaves are infected at the node and may break away at this point. Not all the plants have matured for upon examination of the material I found plants four to eight inches high, which were dead and invariably the same pycnidia and spore was obtained."

Specimens of this disease examined at Washington and Madison, Wis. showed the fungus to be a *Phoma*, but no proof of its pathogenicity was obtained. This Oklahoma trouble adds another puzzle to the root rot problem.

The next report of a take-all disease came from New York, where a disease having the symptoms of the take-all that is described from Europe, and having present in the lesions at the base of the culms an *Ophiobolus*, apparently *Ophiobolus graminis*, was found. H. H. Whetzel has submitted a report on the disease as follows:

"On July 15 Dr. Barrus was visiting our field assistant, Mr. R. G. Palmer, at Rochester, in Monroe County. Mr. Palmer called Dr. Barrus' attention to a circular dead area along the road in the wheat field of Mr. Rambert. A careful examination showed that the plants had died shortly before ripening, but after they had headed out. Dr. Barrus brought specimens to the laboratory, which were carefully examined by Mr. R. S. Kirby and Dr. H. E. Thomas with the result that they found a fungus suspiciously similar to *Ophiobolus graminis* described by McAlpine as the cause of "take-all" in Australia.

"A few days later Mr. Kirby and Dr. Thomas went to Rochester and in company with Mr. Palmer made a very careful and exhaustive examination of the diseased area in the field in which the spot occurred and found the disease completely confined to this single spot, which was about eight feet in diameter. The wheat had in the meantime been cut and shocked. They persuaded the farmer to permit them to completely destroy all of the wheat shocks in this area and for a considerable distance about it in order to make sure that all of the diseased wheat was destroyed. This destruction was affected by spreading the loosened bundles over the area, soaking with kerosene, and burning. In addition to this Dr. Thomas, a few days later and before the wheat had been hauled, destroyed the straw from the shocks surrounding the area which had been burned. This was done by cutting off the heads which the farmer would not agree to have destroyed, but would agree to feed to his chickens in an orchard that would never be used for growing grain. A very careful examination of the stubble in the adjoining area showed no trace of the fungus, which, even in the diseased area, was confined to the lower two internodes.

"Abundant specimens have been preserved for further study and Mr. Kirby and Dr. Thomas are actively at work in an attempt to isolate the fungus and determine its pathogenicity. A careful study of the fungus shows that it corresponds most closely with McAlpine's description. The perfect stage is present in abundance."

During the latter part of August J. G. Dickson from Wisconsin inspected a large number of wheat fields in Wisconsin and Minnesota. He has presented the following summary of the occurrence of a seedling blight of wheat, probably due to Helminthosporium sp. in the northern part of the state.

"Fourteen fields of wheat showed a blight quite different from the so-called take-all, ranging from a trace in most cases to 17% in one field. This latter field showed considerable spotting, which could not be accredited to soil conditions. All isolations made from the field gave the typical Helminthosporium which seems to be causing the blight through these regions. Approximately two acres of the field were engaged for further wheat experiments under the direction of Mr. H. H. McKinney.

"The seedling blight was generally present on the peat soils in Minnesota north of Duluth, varying with different varieties and methods of tillage. Mr. Barker, of Minnesota, reported similar observations in connection with his survey work in that state.

"This seedling blight seems in general quite different from that caused by Gibberella and Fusarium species and can generally be distinguished by the difference in color and presence on the leaves of lesions of Helminthosporium blight.

"While the Helminthosporium seedling blight was found through the northern regions surveyed there are no indications that this is connected with the so-called take-all."

Miss Wanda Weniger of North Dakota also found a similar trouble to that described by Dickson and reported on it as follows, August 18:

"Helminthosporium on wheat was found on Durum varieties, especially D5, D1, and Kubanka, as a blade blight and also as lesions on the bases of the culms and on the glumes and grains. From one to five percent of the heads were attacked in fields examined. As a blade blight, infection was found to run as high as eighty percent."

In Kansas a suspicious case was reported on by L. E. Melchers, September 23, as follows:

"A trip was made to Abilene, Kansas, to look after reports that have come in from an apparent root rot. These fields were visited in the company of Mr. H. H. McKinney of the Office of Cereal Investigations and Mr. Oscar Steanson, High School Teacher in Agriculture.

"Arrangements were made by which some of the fields will be put back into wheat and close supervision made of their behavior next spring. Specimens of wheat stubble were collected for laboratory examination. Information was gathered from reliable sources as to the behavior of these plants last spring. The organism or organisms involved have caused the darkening of the lower portions of the culms and a distinct rotting of the roots, with poorly developed culms, frequently turned white.

"There has been a suspicion that the disease may be take-all. There are field symptoms of its being the disease, but no definite statement can be made until further work has been done on the problem. For the most part, it seems to be occurring in soft wheat."

CORN

Smut caused by Ustilago zeae.

Smut is apparently causing somewhat less damage than usual.

Vermont: Seems to be unusually abundant this year all over the state according to reports. We have had more locally than I have ever seen before.
(Lutman, Oct. 1)

Massachusetts: About the usual amount - not over .5%. (Osmon, Oct. 1)

New Jersey: Common, in some cases abundant. (Cook, Oct. 1)

Virginia: Common, but no severe cases seen - about 1% ear infection on the average. (Fromme, Oct. 1)

Tennessee: Very general over the state, but less than in previous years. Most of the corn was late this year and generally smut is less damaging on late corn. (Essary, Oct. 1)

Georgia: Observed on various parts of the plant in the case of several varieties of field corn, 1% or possibly less in some cases. In sweet and pop corn smut of ears is most important, showing as high as 2%. (McClintock, Oct. 1)

Alabama: Light infection in vicinity of Auburn. No further data. (Thiel, Oct. 1)

Mississippi: Have not observed smut to any degree this season. Specimens have been received from only one county. (Neal, Oct. 1)

Arkansas: Two per cent loss. (Elliott, Oct. 1)

Ohio: Tassel infection is more generally observed this season than usual. Although corn smut may very readily be found in all fields, losses cannot be reckoned greater than during normal seasons. Certain fields of sweet corn have been observed in central Ohio where the corn smut infection is very slight, much below normal. (Thomas, Oct. 1)

Michigan: Not so serious as last year. (Coons, Oct. 1)

Wisconsin: Less than in 1919. Late planted fields show more than early planted. Heavy growing varieties like Evergreen show more than the smaller early varieties. (Vaughan, Sept. 1)

Less than usual. Not considered serious except in sweet corn planted without attention to rotation. (Vaughan, Oct. 1)

South Dakota: Present in every field in small amounts. (Evans, Oct. 1)

Nebraska: Corn smut prevalent throughout the state. (Goss, Oct. 1)

Root, stalk, and ear rots caused by Gibberella spp. and Fusarium spp.

Corn root rot seems to be less important than usual in most of the states reporting its presence. Mississippi, Arkansas, and Ohio, however, report considerable damage from this disease.

G. N. Hoffer of the Office of Cereal Investigations reported the results of a field trip through Indiana, Ohio, Pennsylvania, and New York as follows (Cereal Courier 12: 272, August 20):

"The entire survey showed conclusively that, along with troubles arising from the late planting of corn, due to the unfavorable seasonal conditions, much of the corn is infected. This fact was especially noted when plants in adjacent fields of the same apparent

age would be non-uniform in size and much more so than could be accounted for by differences in rotational practices. Proper care in the selection of seed stocks is imperative. The best soils in all of the localities studied had fields of corn showing many irregularities in growth due to the use of poor, infected seed."

- Massachusetts: Not important. (Osmun, Oct. 1)
- New Jersey: Not so severe as usual. (Cook, Oct. 1)
- Virginia: General but apparently not so severe as last year. (Fromme, Oct. 1)
- Tennessee: Occurs in every field thus far observed; causing considerable loss in broken stalks; a good percentage fallen stalks (down corn). Loss due to sterile stalks high. (Dept. of Botany, Oct. 1)
- Georgia: Present throughout the state, but most serious in south Georgia on the lighter soils. (McClintock, Oct. 1)
- Alabama: Present in small quantities. (Thiel, Oct. 1)
- Mississippi: These troubles have been encountered in several localities in the state. Stunted plants and root rots are common, as well as ear rot. These diseases are no doubt responsible for at least 5% reduction in yield for the state, and I believe are gaining headway. (Neal, Oct. 1)
- Arkansas: Five per cent loss. (Elliott, Oct. 1)
- Ohio: Corn root rot situation is especially alarming in southwestern Ohio, although there is no difficulty in finding evidence of infection in all sections of the state where corn is grown. Fields very badly infected show a loss varying from 25-90%. Where particular attention has been given to the selection of seed corn last fall and also germination tests previous to planting in the spring, very excellent control has been accomplished, although the season has been very favorable for the development of the disease. In many such fields the number of infected stalks is estimated to be less than 1% in sections where the disease has been destructive in previous years. (Thomas, Oct. 1)
- Michigan: Uncommon. (Coons, Oct. 1)
- Wisconsin: Less than in 1919. Some fields on old ground badly diseased. (Vaughan, Oct. 1)
- South Dakota: Present in every field, but not doing extensive damage. (Evans, Oct. 1)
- Nebraska: Corn root rot reported to be present in several counties of eastern Nebraska. General infection with moderate damage in Richardson and Douglass Counties. (Goss, Oct. 1)
- Washington: One report from western Washington. (Heald & Dana, Oct. 1)
- Oregon: Perhaps present as root rot. A few suspicious specimens received. No survey work done to determine extent or damage. (Barss, Oct. 1)

Brown spot caused by Physoderma zeae-maydis.

- Tennessee: Heavy infections in local areas only; not generally severe over the state. (Dept. of Potany, Oct. 1)
- Georgia: Observed on field corn throughout the central and southern parts of the state. (McClintock, Oct. 1)
- Alabama: Early varieties of corn more heavily infected than others. (Thiel, Oct. 1)
- Mississippi: Prevalent in almost every part of the state, but very little damage results. (Neal, Oct. 1)
- Arkansas: Common - not serious. (Elliott, Oct. 1)

Nebraska: Physoderma especially bad in eastern Nebraska this year. See report of September 15. (Goss, Oct. 1)

Bacterial wilt caused by Aplanobacter stewartii

Collaborators in the following states report that this disease has not been brought to their attention this year: Vermont, Massachusetts, New Jersey, Georgia, Alabama, Mississippi, Michigan, Wisconsin, South Dakota, Washington, and Oregon. One report was received in Arkansas and the disease has been observed in Ohio and Virginia this year.

Correction: The statement that bacterial wilt is occurring on field corn in Tennessee (Pl. Dis. Bul. 4 : 70. 1920) is erroneous. Mr. Kurtzweil reported this as a bacterial root rot and not as Aplanobacter stewartii, as implied in the Bulletin. The name of the causal bacterium in this case is not known, but the symptoms resemble those of the bacterial root rot described from Arkansas (Ark. Agr. Expt. Sta. Bul. 162: 1919).

Bacterial root rot, undetermined.

This disease (See Ark. Agr. Exp. Sta. Bul. 162 : 1-7. 1919) has been reported this year from one locality in Arkansas, according to a report from the Department of Plant Pathology at Fayetteville. A somewhat similar disease has also been observed causing damage to field corn in Tennessee according to Carl Kurtzweil.

Leaf blight caused by Helminthosporium sp.

Tennessee: Every field visited this season has shown this disease. Estimated that 30% of the leaf surface is affected. (Dept. of Botany, Oct. 1)

Rust caused by Puccinia sorghi

Rust has been reported as of little importance in Massachusetts, Alabama, and Wisconsin.

Head smut caused by Sphacelotheca reiliana

Washington: Seems to be less prevalent than in previous season. Not known to occur except in the vicinity of Pullman. (Heald & Dana, Oct. 1)

RICE

Blast caused by Piricularia oryzae

Mississippi: A number of fields have been found to be infected in Pearl River County. In one instance, in a field of thirty acres, the

infection is fully 40%. The disease has also been reported from Lauderdale County. It looks as though this disease is destined to become serious in this state. (Neal, Oct. 1)

VEGETABLES AND FIELD CROPS

COTTON

According to the Bureau of Crop Estimates the condition of cotton was 59.1% of normal on September 25, as compared with 67.5% on August 25, 1920, a reduction of 8.4% during the latter part of August and September. This is a somewhat greater reduction than usual, being 3.2% greater than the ten year average. Rotting of the bolls seems to play a considerable part in bringing about this reduction. Many complaints of damage from boll rots have been received from the majority of the cotton states by field men of the Weather and Crop Estimate Bureaus. In some states also "rust" (malnutrition) is causing heavy loss. It is expected, however, that the total crop this year will exceed that of last year by about 800,000 bales.

Fusarium wilt caused by Fusarium vasinfectum

Tennessee: Not generally reported, but has been observed in experimental plots at Jackson, western part of state. No varietal differences noted. (Essary, Sept. 1)

South Carolina: In the wilt infested section of lower South Carolina on the S. A. L. Railway from Fairfax to the Georgia line, I saw several hundreds of acres where the dead and dying plants constituted from 5-10% of the total plants. (Armstrong, Sept. 1)

Texas: Prevalent in light soils - 1½% loss. (Taubenhaus, Sept. 1)

Root knot caused by Heterodera radicicola

South Carolina: Injury slight on a few farms in Saluda County near Monetta. Injury about 2% in a 40-acre field in Allendale County. Another field of 75 acres showed about 4% injury. Injury slight to none in several fields aggregating 200 acres near Barnwell, in Barnwell County. (Armstrong, Sept. 15)

Texas: Traces - unimportant. (Taubenhaus, Sept. 1)

Anthracnose caused by Colletotrichum gossypii

Tennessee: Very abundant. Damage serious. Heavy shedding is reported, but whether this is due to attacks of the anthracnose-fungus has not yet been determined for this season. (Essary, Sept. 1)

South Carolina: Anthraonose injury was slight in all fields visited - less than 1%. These reports cover conditions as I have observed them in sections of three counties in South Carolina,- namely, Allendale, Barnwell, and Saluda. (Armstrong, Sept. 15)

Texas: Prevalent - 2% loss. (Taubenhaus, Sept. 1)

Angular leaf spot caused by Bacterium malvacearum

Tennessee: Very common wherever cotton is grown. Exceptional rains in August. (Essary, Sept. 1)

Texas: Prevalent in poorly drained land - 2% loss. (Taubenhaus, Sept. 1)

Root rot, caused by Ozonium omnivorum, is epiphytotic this year in Texas according to J. J. Taubenhaus.

POTATO

Potato wart caused by Chrysophlyctis endobiotica

As a result of the 1920 survey for potato wart the disease has been found in five new localities in western Pennsylvania and three villages in Maryland. The discoveries in Maryland add a third state to the list of those where the disease occurs.

The present known range of potato wart in the United States, then, based on surveys in 1919 and 1920, includes the original district in the eastern Pennsylvania anthracite coal fields and the area in western Pennsylvania, western Maryland, and northern West Virginia. The limits of the western area as we now know them are Clarence in Center County, Pennsylvania, on the northeast and Whitmer in Randolph County, West Virginia, on the southwest, a distance of about 175 miles.

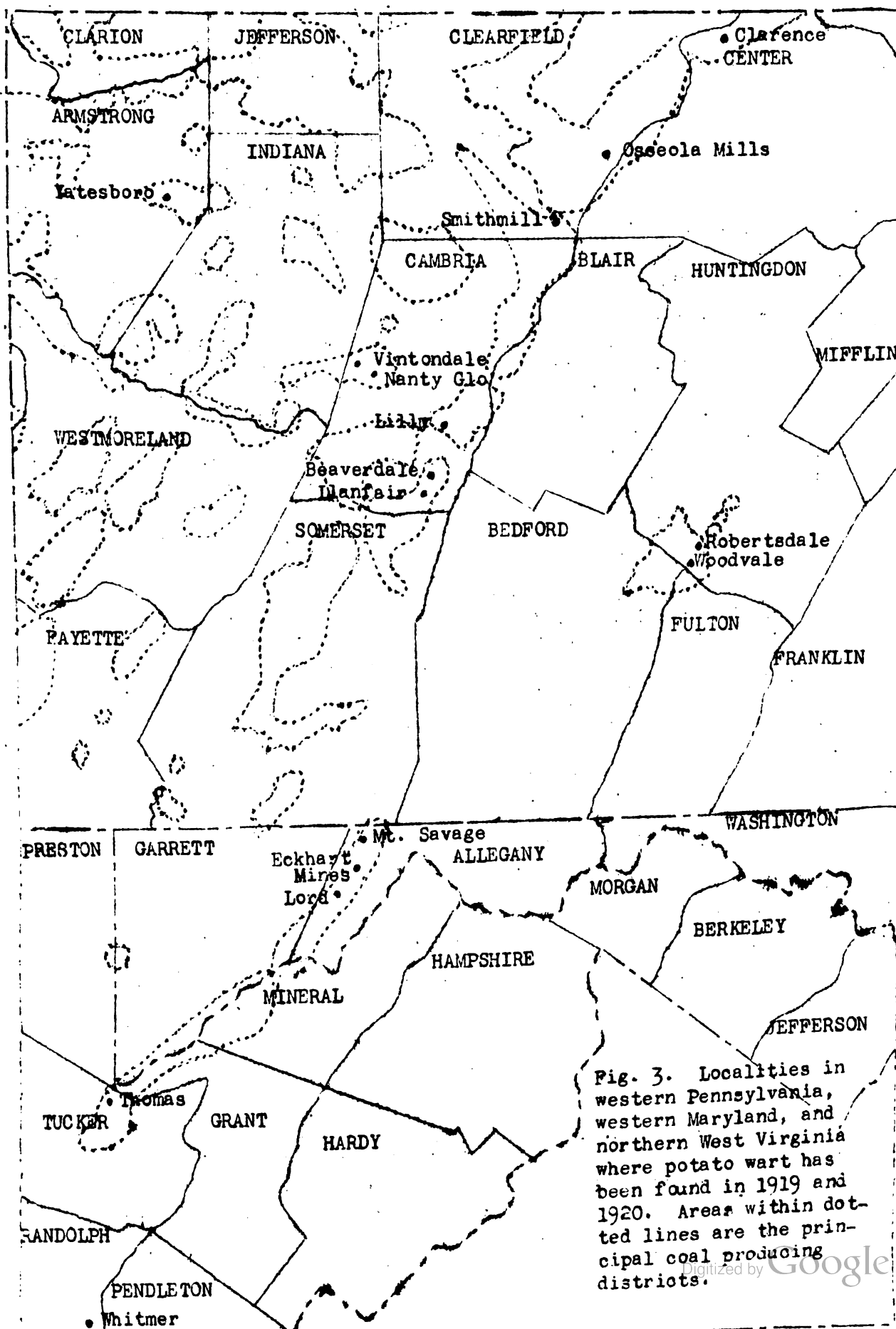
The greatest width is in Pennsylvania from Robertsdale in Huntingdon County to Yatesboro in Armstrong County, which is approximately 80 miles. Undoubtedly other infested localities as yet undiscovered exist in the bituminous coal mining section. Unlike the infestation in eastern Pennsylvania, the infested localities in the soft coal regions apparently are scattered and the disease occurs in a single garden or in a small number of gardens in each village.

The accompanying map shows the location of the places in the western area where the disease has been found to date.

SUGAR CANE

Mosaic (cause undetermined)

Mosaic is causing serious damage in some sections of Mississippi, according to the reports received. It is said to be of considerable importance in the Hawaiian Islands.



Georgia: Reported as spreading rapidly in south Georgia, especially in Grady County. Reported on all varieties except one - a Japanese variety. (McClintock, Aug. 15)

Mississippi: Reported by Miles of the State Plant Board as being present in six separate localities in Harrison County. In Harrison County the infection does not run over 5% in any of the fields reported as having the disease. The disease has also been observed in Hancock and Jackson Counties, where in some fields the infection runs as high as 90%. (Neal, Sept. 1)

Louisiana: The mosaic disease of sugar cane has appeared in the Parishes adjoining the Mississippi River. (Weekly Crop Notes, Sept. 23)

Hawaii: Next in importance to root rot is the mosaic or yellow stripe disease. Eleven different varieties of cane are grown commercially here. None of these varieties is immune to yellow stripe, but they do show great differences in susceptibility. It seems that the varieties that are grown at high elevations are particularly susceptible. I am not yet sure just how serious the yellow stripe is. It seems to be most prevalent on the Island of Hawaii. (L. O. Kunkel, News Notes of the Office of Cotton, Truck, and Forage Crop Disease Investigations, April 24)

Gumming disease caused by Bacterium vascularum

The gumming disease of sugar cane has been reported to the Survey from Porto Rico in the Trujillo Alto district, where it was first observed by J. Matz in February of this year. (See also Phytopath. 10: 429-430. Sept. 1920) While the disease is at present confined to an area of about fifteen kilometers, as shown on the accompanying map, it is said to be spreading, and to be serious in the places where it occurs, causing as much as 50% injury in some cases. In the places where it has been found no new introductions of seed have been made for many years. It is thought that the disease has probably been present in insignificant amounts for some time, and was favored to the extent of causing an epidemic by the unusually heavy rains of the early part of the year.



Fig. 4. Map showing distribution of the gumming disease of sugar cane in Porto Rico, according to J. Matz.

PEANUT

Leaf spot caused by Cercospora personata.

Georgia: Observed on all varieties of peanuts. (McClintock, Oct. 1)

Alabama: Very heavy infection at Auburn. Responsible for premature falling of leaves. (Thiel, Oct. 1)

Mississippi: Observed in one field at Wiggins, Stone County - damage slight. (Neal, Oct. 1)

Arkansas: More severe than usual. Some injury. (Elliott, Oct. 1)

FRUITS

APPLE

Further reports on apple diseases indicate the general prevalence of scab in the northern and eastern apple states and the rather unusual severity of fire blight on the apple over the same area.

Scab caused by Venturia inaequalis

Maine: First noticed June 11 in the vicinity of Corinna. But few cases of infection and little damage noted up to and including Sept. 11. (C. R. Stevenson, Sept. 11)

Vermont: Some infection locally on all the susceptible varieties. Probably a little more than normal. (Lutman, Sept. 1)

New Hampshire: General throughout the state and considerable damage done to fruit of susceptible varieties. (Butler, Sept. 1)

Tennessee: Unusually abundant this year. (Essary, Sept. 1)

Indiana: Extremely prevalent. (Gardner, Sept. 1)

Wisconsin: Scab is more destructive than usual except in well-sprayed orchards. (Vaughan, Sept. 1)

Texas: None found. (Taubenhaus, Sept. 1)

Fire blight caused by Bacillus amylovorus

Vermont: Very common locally in large orchards. Almost all trees that have much fruit have a considerable percentage of fire-blight of the flower twigs. (Lutman, Sept. 1)

New Hampshire: Mainly in the form of blossom blight. Injury unimportant. (Butler, Sept. 1)

Texas: Very prevalent. 10% loss. (Taubenhaus, Sept. 1)

Indiana: Very destructive, especially where blighted pear trees are nearby. (Gardner, Sept. 1)

Wisconsin: Unusually severe this season. Many young trees have been nearly killed. The losses will be heavy but almost impossible to estimate. Wealthy and McMahon have been especially susceptible. The northwestern Greening is quite resistant. (Vaughan, Sept. 1)

Blotch caused by Phyllosticta solitaria

Pennsylvania: Dr. W. S. Beach, Field Laboratory, Bustleton, Pa. says blotch is the most important apple disease in that locality.

Occurs generally throughout the state, damage slight except on unsprayed trees. Worst on Smith Cider, Maiden Blush, Ben Davis, and all sweet apples. (Department of Botany, Sept. 1)

Texas: Prevalent. 5% loss. (Tauberhaus, Sept. 1)

Indiana: Very abundant on susceptible varieties in southern half of state. (Gardner, Sept. 1)

PEACH

Brown rot caused by Sclerotinia cinerea

There was less brown rot in New York peaches than usual this year due apparently to dry weather at and prior to picking time. In Pennsylvania and New Jersey and states farther south it caused considerable damage. (See also Pl. Dis. Bul. 4 : 19-20; 64-66. July 15 and Sept. 1)

New York: Very little of this disease was seen on fruit in the packing houses, but a small amount of rotten fruit, mummies and killed twigs was found in every orchard visited. In a 200-acre orchard near Webster in Monroe County, it seemed to be worse on trees growing on low ground. The whole district this year had dry weather at picking time, and for two or three weeks previously, a fact which probably accounts for the small amount of Rot this year as compared with last, when there was more rain. (D. H. Rose, Bu. of Markets Div. Letter 1²⁷: 9. Sept. 30)

New Jersey: Wet, muggy weather has caused considerable rot. (Weekly Crop Notes, Sept. 2)

Pennsylvania: Damage very considerable. Confirming earlier report (see Pl. Dis Bul. 4 ; 66, Sept. 1, Thurston, Aug. 15)

Delaware: Peaches have had too much rain and there is some complaint of rot. (Weekly Crop Notes, Sept. 2)

Maryland: Some complaint of peaches showing rot. (Weekly Crop Notes, Sept. 2)
Peaches reported to be rotting in some sections. (Weekly Crop Notes, Aug. 26)

Virginia: Peaches rotting badly in farm orchards. (Weekly Crop Notes, Sept. 2)

North Carolina: Suffering from considerable rot. (Weekly Crop Notes, Aug. 26)

Scab caused by Cladosporium carpophilum

Pennsylvania: Prevalent on all unsprayed peaches. No estimate as to damage. (Thurston, Aug. 15)

Indiana: Very severe attack on the fruit in the Vincennes region. Much worse than last year. (Gardner, Aug. 15)

Black spot caused by Bacterium pruni

Indiana: Extremely severe this year in the Vincennes region. Caused defoliation by its leaf attack, death of small branches by girdling cankers, and severe blemishing of fruit. There was severe hail injury and practically every hail wound was infected with Bacterium pruni.

Illinois: Bacterial shot hole of peach is quite serious on the fruit in this state, especially the southern half. (Anderson, Aug. 24)

Crown gall caused by Pseudomonas tumefaciens

Ohio: In one orchard investigated, nearly all trees of the early Crawford and Trumbull varieties were infected. In no instance was the Elberta found to be infected. In some orchards the spread of infection has been quite evidently accomplished through drainage water. In such cases the losses have been very severe. (Thomas, Aug. 15)

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PLANS FOR SUMMARIZING 1920 DATA

In preparing the summaries of diseases for the year 1919 we were fortunate in having the assistance of Dr. A. G. Johnson of the Wisconsin Experiment Station and Mr. Lee M. Hutchins of the Office of Fruit Disease Investigations of the U. S. Department of Agriculture, Dr. Johnson working on cereal diseases and Mr. Hutchins on fruit diseases. We hope to continue this practice in the future and each year to secure the assistance for a few weeks during the winter of two or more collaborators or specialists from the Bureau of Plant Industry to cooperate with us in summarizing and interpreting the past season's disease data.

Our object in following this plan is twofold. In the first place the value of the annual summaries is increased because the accumulated information in our files is critically reviewed and studied by experts on the diseases of various crops, who bring to the work year after year new points of view and fresh interest in the problems presented. In the second place an opportunity is thus afforded plant pathologists to become more intimately acquainted with the present work and problems of the Survey. There is thus developed a closer understanding and a stronger spirit of cooperation, which is an asset of great importance for the future development of the Plant Disease Survey and for its increased usefulness.

This winter Dr. F. D. Fromme of the Virginia Experiment Station will spend one month with us summarizing the diseases of cereal crops and Dr. H. W. Anderson of the Illinois Experiment Station will spend an equal time working on fruit diseases. We are anxious that the annual reports from the states this year, especially those on diseases of cereals and fruit crops, may be as full and complete as possible and that they may come in promptly from all states.

COLLABORATORS' ANNUAL CEREAL REPORTDue November 1

The annual report on cereal diseases has already been called for, due November 1. The report on other crops will be asked for about December 15. It is hoped that collaborators will be getting their data together so that the reports can be made promptly, and it is especially hoped that all users of this Bulletin will cooperate with the collaborators in their states by furnishing whatever information they may be able to contribute.

PLANT DISEASE BULLETIN MAILING LIST STATISTICS

The regular numbers of the Plant Disease Bulletin are issued twice monthly during the summer months, and in addition, Supplements giving special reports and summaries are published from time to time.

The Bulletin reaches about 496 persons in various professions who are distributed geographically according to the accompanying table. In the group of Plant Pathologists are included those persons who are distinctly engaged in plant pathological work or who are members of the American Phytopathological Society. In the group of Botanists and Agriculturists are listed the names of botanists in the broad sense, teachers of botany, agronomists, plant physiologists, crop specialists, etc. The miscellaneous group is made up of the names of administrators such as heads of offices in the Government service, directors of experiment stations in the states, railroad officials, teachers, etc.

Table 14. Classification of mailing list of the Plant Disease Bulletin according to professions and geographic location.

Plant pathologists		
(a) in Washington	67	
(b) in States	177	
(c) in Canada	6	
(d) in Foreign Countries	8	258
Botanists and agriculturists		
(a) in Washington	17	
(b) in States	66	
(c) in Canada	11	
(d) in Foreign Countries	5	99
Libraries		
(a) in Washington	3	
(b) in States	26	
(c) in Canada	2	
(d) in Foreign Countries	4	35
Entomologists		
(a) in Washington	2	
(b) in States	4	6
County agents in States		10
Market inspectors in States		14
Miscellaneous		
(a) in Washington	7	
(b) in States	67	74
Total		496
Total number in Washington		96
Total number in States		364
Total number in Canada		19
Total number in Foreign Countries		17

POTATOLate blight caused by *Phytophthora infestans*.

Reports from Vermont indicate that this has been one of the worst years as far as late blight is concerned that the state has experienced. Recent reports have also been sent in showing the present situation in Ohio, Wisconsin, and Oregon. The detailed reports are as follows:

- Vermont: General, state-wide infection. Occurs everywhere this year on all types of soil. Tuber rot is bad, especially on heavy clays, and will cause a loss through the state of 25-50% of the entire crop. One of the worst blight years we have ever had here. (Lutman, Oct. 15)
- Ohio: Distributed throughout the state, with infection more severe in central and northeastern regions where there has been abundant precipitation throughout the season. Infection much less in the northwest and western regions where drier conditions have prevailed. There have been many reports received of the appearance of wet rot in fields of both early and later planting. Evidence is lacking to determine accurately how much of this wet rot is due to late blight. (Detmers, Oct. 15).
- Wisconsin: Scattering tuber infection has been found in the northern and north-eastern counties and in Sauk County. Losses will be practically "nil". (Vaughan, Oct. 15)
- Oregon: Reports of severe damage to vines being received from Coast sections. Did not appear until late September. Damage will be in development of tuber rot rather than in reduced yields. Total extent and distribution of damage not yet determined. (Barss, Oct. 15)

Mosaic (cause undetermined)

Field study this year has shown that mosaic is more widely distributed and more destructive than was commonly supposed. The reports given below from Vermont and Oregon are of special interest.

- Vermont: About 25-50% of plants affected. The loss from it will be much smaller than usual on account of the cool, rainy season. Tip-burn is more severe on bad mosaic types and the hot weather did not appear this year - at least not hot enough to make much tip-burn. (Lutman, Oct. 15)
- Oregon: Mosaic was found this year in a rather large number of plants in some fields. It is widely distributed, occurring in at least a small percentage of plants in most fields seen. The loss from reduced yield is probably not large. The chief damage is in a reduction of the quality of the potatoes for seed purposes. (McKay, Oct. 15)

Verticillium wilt caused by *Verticillium albo-atrum*.

The only report of this disease that has thus far been received by the Survey is from Oregon. This report is as follows:

- Oregon: Verticillium wilt occurred commonly in the potato fields in Western

Oregon. in most cases, however, the percentage of affected plants was low. The loss in yield may be around 3%, though no exact figures are available. (McKay, Oct. 15)

TOMATO

Fusarium wilt caused by *Fusarium lycopersici*.

Since the last report on this disease, notes of occurrence have been received from Massachusetts, Pennsylvania, and Kentucky. In Massachusetts and Kentucky the disease is not at all serious, but in Pennsylvania as high as 50% infection was reported from Westmoreland County.

In Kentucky, according to Valleau, the disease is "common in many sections of state. Found in 25-40% of fields near Henderson and Owensboro. In many cases infection in new land can be traced to infected seedbeds."

Leaf spot caused by *Septoria lycopersici*

Reports of heavy losses from leaf spot have been received from Pennsylvania and Kentucky under date of September 15. In Pennsylvania J. H. Muncie reported very severe infection in Erie County, only one or two pickings being made in many commercial fields.

In Kentucky serious losses occurred wherever tomatoes were grown and both early and late crops were affected.

Bacterial blight caused by *Bacterium solanacearum*

During the last month reports of the non-occurrence of this disease have been received from the following states: Massachusetts, New York, New Jersey, Kentucky, Tennessee, Ohio, Indiana, Michigan, Wisconsin, Minnesota, Oregon, and Washington. Affirmative reports are at hand, however, from Virginia, Texas, and Arizona. Of these three states Arizona is the only one that reports any particular damage. Regarding the trouble J. G. Brown of that state reports as follows:

"Definitely determined in material from Jerome, Arizona, in both cultures and by staining in situ in stem sections. Probably common. Has been mistaken for Fusarium wilt. Damage probably 10%."

Other diseases.

Late blight caused by *Phytophthora infestans* is very general on tomatoes in Pennsylvania this year, according to reports from the Department of Botany at State College. Losses of from 10 to 20% have been reported and it is thought that the unusual occurrence this year is correlated with the late blight of potatoes.

Western yellow blight (cause not fully determined) is reported by

H. P. Barss as common in the Columbia basin and eastern portion of Oregon. The damage is severe this year. The disease is the limiting factor of tomato growing in these regions.

Buoyeye rot caused by Phytophthora terrestris has been reported by F. J. Pritchard as being very common in the experimental plots at the Arlington Experimental Farm, Virginia. In certain fields it probably destroyed .5% of the fruit.

Stripe, cause undetermined. This disease, which is probably the same as the winter blight that has been reported from Pennsylvania in past seasons, is now being found in New York rather commonly. According to the Department of Plant Pathology at Ithaca, the disease is prevalent in Niagara County and doing a large amount of damage. In badly infested fields practically all the leaves were killed, and no field in Niagara County seemed to be free from the disease. Stripe also has been found in other parts of the state, both in the field and in the greenhouses.

CABBAGE

The following report by F. D. Fromme regarding conditions in the cabbage section of southwestern Virginia is of interest:

"Dr. L. L. Harter and the writer spent July 26 and 27 on a disease survey of the cabbage section of southwestern Virginia. This section, which extends from Wytheville to Marion, comprises about 5,000 acres grown chiefly as a late crop for southern markets. One unusual feature of the section is the elimination of seed beds, the seeding being done directly in the field. A few extra early fields are set with plants shipped in from the south. The principal disease is yellows. This was found to some extent in nearly all fields visited and amounted to 80% infection in the worst field. Black leg was second in importance, but did not exceed 10% in any field seen. Soft rot (B. carotovorus) was found in a few fields on early plants. Not a single case of club root or black rot was seen. The principal variety is All Head Early. Others grown to a lesser extent are Copenhagen Market and Danish Ball Head."

Club root caused by Plasmodiophora brassicae

In most states reporting the disease, club root is apparently only locally important, but it is said to be prevalent and serious in some cases in the northern part of Ohio.

Vermont: Considerable locally - occasional elsewhere in gardens and market gardens on cabbage and cauliflower. (Lutman, Oct. 15)

Connecticut: In every garden that I examined, the owner complained of club root and it seemed to be very prevalent. This was in an Italian settlement where the gardens were well taken care of. (George Haines, July 24)

Rhode Island: Heavy infestation in one garden, Woonsocket. (Hesler, Aug. 4)

Pennsylvania: Few reports, local in Lackawanna, Luzerne, Pike and Center Counties. (Thurston, Oct. 15)

Ohio: Prevalent throughout the northern counties of the state. Observations made on field trips show from 50 to 75% infection in some gardens. (Detmers, Oct. 15)

Wisconsin: A small amount of this disease has been observed in Racine and Kenosha section. I have also one specimen from Portage County. It seems to be spreading. (Vaughan, Oct. 15)

Minnesota: First report July 1st from Ramsey County. Seventy-five percent of the plants infected and fifty percent of reduction in yield in a two-acre field. Several other fields fairly badly affected observed in Ramsey County. (Stakman, Oct. 15)

Oregon: Reported as present in state but total damage probably not large. (Barss, Oct. 15)

Yellows caused by Fusarium conglutinans

Yellows is said to be prevalent and doing considerable damage in Ohio. In Wisconsin it has caused less apparent loss than usual. In Minnesota only one report was received (Plainview, July 27) and it has been reported from Adams and Huntingdon Counties in Pennsylvania.

Wisconsin: The losses from yellows have been less than usual. It is considered that this is associated with the lower soil temperature than occurred in 1919. In one test field - Union Grove - six of seven head strains of Wisconsin All Seasons gave a stand free from yellows, while the check row gave 67% yellows. (Vaughan, Oct. 15)

Black leg caused by Phoma lingam

Pennsylvania: Some damage in Philadelphia County. (Thurston, Oct. 15)

Wisconsin: There is considerable black leg present and mixed with black rot. The farmers call it all rot and often fail to understand why the so-called Wisconsin Hollander is not free from disease. (Vaughan, Oct. 15)

Black rot caused by Bacterium compestre

In Vermont and Wisconsin black rot is reported as more prevalent than it has been for several years. The disease is said to be causing considerable damage in parts of Ohio and Minnesota.

Vermont: Observed locally in market gardens. Not severe but fairly common for the first time in years due to the very wet September. (Lutman, Oct. 15)

Ohio: Specimens were received from Montgomery and Richland Counties. Observations made during a field trip show very severe infection in Washington County Truck Farms. (Detmers, Oct. 15)

Wisconsin: There is more black rot than for several years. Dane, Outagamie and Brown Counties have been especially hard hit. It seems to be associated with imported Hollander seed. Domestic grown seed is practically free from black rot and where plants from different seed sources

meet there is only a small amount of spread. (Vaughan, Oct. 15)

Minnesota: General in Wabasha County. Number of infected plants ranging from trace to 98%. Average loss probably 10-15%. (Stakman, Oct. 15)

Bacterial soft rot caused by Bacillus carotovorus

Wisconsin: Soft rot is accompanying black rot in many store houses and car shipments. There is more than usual owing to the high autumn temperatures. (Vaughan, Oct. 15)

COTTON

Additional reports on cotton diseases are of the same general nature as those given in previous numbers of the Bulletin (Pl. Dis. Bul. 4 : 77-79; 108-109. Sept. 15 and Oct. 15, 1920).

Fusarium wilt caused by Fusarium vasinfectum

Tennessee: Observed at Jackson, West Tennessee, in September. Not serious. (Hesler, Oct. 15)

Mississippi: Occurs widely over the state. Mainly on the sandy loam soils and where non-wilt varieties are employed. (Neal, Oct. 15)

Arkansas: Severe in Mississippi Valley this year. Infection pretty general in the eastern part of the state, 3-5% loss. (Elliott, Oct. 15)

Root knot caused by Heterodera radicicola

Mississippi: Observed only on the Experiment Station farm. (Neal, Oct. 15)

Arkansas: Some reported in the sandy sections. Probably much more severe than is known, possibly 1% loss. (Elliott, Oct. 15)

Anthracnose caused by Colletotrichum gossypii

Tennessee: All fields observed showed more or less anthracnose this season. The infection percentage ranged from 1-90%. Damage for 1920 average. (Hesler, Oct. 15)

Mississippi: Present in several localities in the state, but the weather has not been favorable for its spread this season, consequently little damage has been reported. (Neal, Oct. 15)

Arkansas: Severe on some cotton, especially half and half, from seed brought in from east of the Mississippi River. 2% loss. (Elliott, Oct. 15)

Angular leaf spot and boll rot caused by Bacterium malvacearum

Bacterium malvacearum is generally prevalent in the Salt River and Santa Cruz Valleys in Arizona, causing severe damage as black arm and angular leaf spot

and slight damage by inducing the premature opening of the bolls, according to J. G. Brown. The disease is also reported from Arkansas as follows:

Arkansas: Very general and in some cases severe. It initiates a large percentage of boll rots that occur when weather conditions are favorable. 3% loss. (Elliott, Oct. 15)

"Rust" or malnutrition (non-parasitic)

Reports by G. M. Armstrong from South Carolina and Georgia, and J. A. Elliott from Arkansas, indicate that "rust" is not important in those states this year. Abundant moisture in Arkansas is given as the probable cause.

PEANUT

Leaf spot caused by Cercospora personata is reported as very common in Louisiana and common on the White Spanish variety in Tennessee. In this latter state White Spanish seems to be more susceptible, perhaps because of the difference in stage of development, this variety being more mature than the others.

Sclerotial blight caused by Sclerotium rolfsii has been observed at the Western Tennessee Experiment Station at Jackson in September, according to a report by L. R. Hesler from Tennessee. In Louisiana C. W. Edgerton also reports the disease as more or less common, but the total loss is not large.

Leaf blight, probably caused by Botrytis sp., was fairly common in the field at Jackson, Tennessee, during September, according to C. D. Sherbakoff.

RICE

The following reports on rice diseases have been received from C. W. Edgerton of Louisiana under date of October 1:

Blast caused by Piricularia oryzae is about the same as usual. The loss has not been heavy, though the disease is common.

Leaf spot caused by Cercospora spp. is common everywhere, but loss is slight.

Straight head or blight (physiological) is very abundant and especially severe this season. In the river district, where a large amount of new land has been put into rice, the loss has been heavy.

Black leaf spot (cause undetermined) is very common and abundant, as usual. Loss very slight.

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UNITED STATES DEPARTMENT OF AGRICULTURE

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